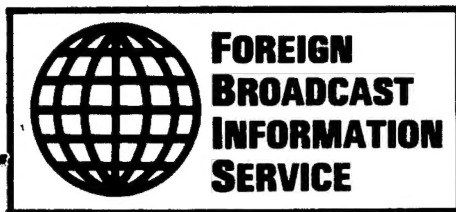


JPRS-CST-87-023 212020

5 JUNE 1987



JPRS Report

Science & Technology

China

DTIC QUALITY INSPECTED 2

Reproduced From
Best Available Copy

REPRODUCED BY
U.S. DEPARTMENT OF COMMERCE
NATIONAL TECHNICAL
INFORMATION SERVICE
SPRINGFIELD, VA 22161

19990113 046

28
111
AOC

SPECIAL NOTICE

Effective 1 June 1987 JIRS reports will have a new cover design and color, and some reports will have a different title and format. Some of the color changes may be implemented earlier if existing supplies of stock are depleted.

The new cover colors will be as follows:

CHINA.....	aqua
EAST EUROPE.....	gold
SOVIET UNION.....	salmon
EAST ASIA.....	yellow
NEAR EAST & SOUTH ASIA...	blue
LATIN AMERICA.....	pink
WEST EUROPE.....	ivory
AFRICA (SUB-SAHARA).....	tan
SCIENCE & TECHNOLOGY.....	gray
WORLDWIDES.....	pewter

The changes that are of interest to readers of this report are as follows:

All science and technology material will be found in the following SCIENCE & TECHNOLOGY series:

- CHINA (CST)
- CHINA/ENERGY (CEN)
- EUROPE & LATIN AMERICA (ELS)
- JAPAN (JST)
- USSR: COMPUTERS (UCC)
- USSR: EARTH SCIENCES (UES)
- USSR: MATERIALS SCIENCE (UMS)
- USSR: LIFE SCIENCES (ULS)
- USSR: CHEMISTRY (UCH)
- USSR: ELECTRONICS & ELECTRICAL ENGINEERING (UEE)
- USSR: PHYSICS & MATHEMATICS (UPM)
- USSR: SPACE (USP)
- USSR: SPACE BIOLOGY & AEROSPACE MEDICINE (USB)
- USSR: SCIENCE & TECHNOLOGY POLICY (UST)
- USSR: ENGINEERING & EQUIPMENT (UEQ)

The USSR REPORT: MACHINE TOOLS AND METALWORKING EQUIPMENT (UMM) will no longer be published. Material formerly found in this report will appear in the SCIENCE & TECHNOLOGY/USSR: ENGINEERING & EQUIPMENT (UEQ) series.

If any subscription changes are desired, U.S. Government subscribers should notify their distribution contact point. Nongovernment subscribers should contact the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161.

JPRS-CST-87-023

5 JUNE 1987

SCIENCE & TECHNOLOGY

CHINA

CONTENTS

AEROSPACE

- PRC Space Satellite Achievements Highlighted
(Zhang Chunting; LIAOWANG OVERSEAS EDITION, No 17, 27 Apr 87) 1
- Nanchang Developing New Fighters, Antiship Missiles
(Yin Jun; TA KUNG PAO, 14 May 87) 6

APPLIED SCIENCES

- Chinese Character Input System Schemes Described
(Wang Xiaolong; DIANZI XUEBAO, No 1, Jan 87) 8
- IF Statement Loop Vectorization Algorithm Described
(Fan Zhihua; DIANZI XUEBAO, No 1, Jan 87) 17
- Development of Mullite Bricks for Hot-Blast Stove
(Zhang Zhenquan, et al.; NAIHUO CAILIAO, No 1, 20 Jan 87) ... 26
- Separation of Basic Magnesium Carbonate From Magnesite by Carbonation
Process
(Quan Hongdong, et al.; NAIHUO CAILIAO, No 1, 20 Jan 87) 27
- Approach To Improve Thermal Shock Resistance of Refractories
(Wang Runze, et al.; NAIHUO CAILIAO, No 1, 20 Jan 87) 28
- Microcrack and Crystal Type of ZrO_2 in Fustcast Zirconia-Corundum
Refractory
(Chen Xianqiu, et al.; NAIHUO CAILIAO, No 1, 20 Jan 87) 29

Incompressible Theory of Interaction Between Moving Bodies and Vorticity Field-Force on Moving Bodies by Vorticity Field (Wu Jiezh; KONGQI DONGLIXUE XUEBAO, No 1, 1987)	30
Transonic Flow Field Analysis for Real Fuselage Configurations (Wang Zhaoqian; KONGQI DONGLIXUE XUEBAO, No 1, 1987)	31
Data Processing Method for High Angle of Attack Testing With Rolling Angle (Jiang Guiqing; KONGQI DONGLIXUE XUEBAO, No 1, 1987)	32
Research on Flow Around Bluff Bodies, Flow Induced Vibrations (Sun Tianfeng, Cui Erjie; KONGQI DONGLIXUE XUEBAO, No 1, 1987)	33
Propagation of Artificial Disturbances Immersed in Thick Turbulent Boundary Layer (Ming Xiao, H. U. Meier; KONGQI DONGLIXUE XUEBAO, No 1, 1987)	34
Experimental Research on Center of Pressure of Slender Body With Two Pointed Ends (Jia Qu Yao; KONGQI DONGLIXUE XUEBAO, No 1, 1987)	35
New Definition of Pressure-Center Coefficient of Reentry Craft With Asymmetrical Configuration (Ren Yuhe; KONGQI DONGLIXUE XUEBAO, No 1, 1987)	36

NATIONAL DEVELOPMENTS

Work in Superconductors Described (Chen Zujia; RENMIN RIBAO OVERSEAS EDITION, 17 Jan 87)	37
Ruan Chongwu on S&T Research Fund Reform (XINHUA, 29 Apr 87)	40
S&T Policies Create Financial Difficulties for Institutes (Chen Dong; KEJI RIBAO, 10 Jan 87)	41
Leader Urges Adoption of 'Dual Unleashing' S&T Policy (Han Yuqi; KEJI RIBAO, 6 Jan 87)	43
Liaoning Agricultural Project Model Spark Plan (Jiang Min; LIAOWANG OVERSEAS EDITION, No 3, 19 Jan 87)	46
Technology Markets' Progress Reported (Yang Jisheng; LIAOWANG OVERSEAS EDITION, No 3, 19 Jan 87) ...	51
Boeing Demonstrates Helicopters for CAAC (XINHUA, 21 Apr 87)	55
Post, Telecommunications Service Improving (XINHUA, 30 Apr 87)	56

Post, Telecommunications Research Updated (Yang Like; XINHUA Domestic Service, 30 Apr 87)	57
Satellite Launch Center Aids Local Economy (Ma Yinchang, Li Yong; KEJI RIBAO, 25 Jan 87)	58
Marine Monitoring Forecasting Network Takes Shape (Wang Yongfu; RENMIN RIBAO, 6 Apr 87)	60
Satellite Ground Station Makes Contributions (XINHUA Hong Kong Service, 27 Apr 87)	62
Work Related to Invention Awards To Be Reformed (Zhou Peirong; XINHUA Domestic Service, 28 Apr 87)	64
CAS Institute Heads Discuss Personnel Changes (RENMIN RIBAO OVERSEAS EDITION, 27 Jan 87)	65
Defense Industry Development of Civilian Products in 1986 (RENMIN RIBAO OVERSEAS EDITION, 26 Jan 87)	67
Shanghai Branch of CAS Notes Major S&T Achievements (KEJI RIBAO, 27 Jan 87)	69
Report on S&T Legislation Conference (Yang Shiguang, Chen Zujia; RENMIN RIBAO OVERSEAS EDITION, 14 Feb 87)	70
NDSTIC-Affiliated Units' Activities Noted (Yuan Bin; KEJI RIBAO, 25 Jan 87)	72
NDSTIC Units' S&T Trade Fair Activities (Xi Qixin; KEJI RIBAO, 25 Jan 87)	74
NDSTIC Design Institute Aids Local Construction Projects (Li Peicai; KEJI RIBAO, 25 Jan 87)	76
MAI, Shaanxi Light, Textile Industries Cooperation (Zhang Gefei, Yu Jing; KEJI RIBAO, 12 Jan 87)	78
Shaanxi S&T System Restructuring Progress Report (Luo Qingshan; SHAANXI RIBAO, 18 Dec 86)	80
Role of Science Associations in Industries (Zheng Tianfen; KEJI RIBAO, 5 Jan 87)	82
Problems of S&T Personnel in Industries Discussed (KEJI RIBAO, 5 Jan 87)	84
Oceanography Survey Base Helps Local Shipbreaking Work (Wang Wenqing; KEJI RIBAO, 25 Jan 87)	86

Chinese Shipbuilding Weathers Bleak Market (Zhang Pingling; RENMIN RIBAO OVERSEAS EDITION, 17 Jan 87) ...	87
Coastal-Interior Technical Exchange Projects Reported (Li Zhenghua, et al.; KEJI RIBAO, 6 Jan 87)	89
Official Claims S&T Consulting Services Unfairly Criticized (Li Baoheng Interview; KEJI RIBAO, 8 Jan 87)	91
Hebei Governor Discusses S&T Progress (KEJI RIBAO, 9 Jan 87)	94
Reasons for S&T Not Advancing, by Zhang Gefei	94
S&T Personnel Compensation Problems	96
Prospects for Yunnan's S&T Development Bright (YUNNAN RIBAO, 29 Dec 86)	99
Briefs	
Astronomers Observe Milky Way	101
Nongovernmental Science Enterprises Formed	101
Sino-Canadian Joint Effort	101
Superconductive Wire Developed	102
International Exchanges Encouraged	102
Superconductor Research Center Planned	102
Microwave Relay	103
Mass Production Computers	103
Two New Computers Developed	103
Robot Spray Painter Produced	104

/9987

PRC SPACE SATELLITE ACHIEVEMENTS HIGHLIGHTED

HK040700 Hong Kong LIAOWANG OVERSEAS EDITION in Chinese No 17, 27 Apr 87
pp 14-15

[Article by Zhang Chunting (1728 2504 0030): "China's First Experimental Communications Satellite Has Been up for 3 Years"]

[Text] Since the first Chinese experimental communications satellite was successfully launched in April 1984 and fixed in the sky over the equator at Longitude 125 degrees East, it has been moving normally in orbit for 3 years, fulfilling or overfulfilling the target of 3-year work life stipulated by the original plan and experimental outline. The successful accomplishment of this task has added a brilliant page to the development history of the Chinese space cause.

What has this communications satellite done over the last 3 years, and how exactly does it function?

All the Tests Conducted on the Satellite Were Successful

Just as its name implies, this experimental communications satellite concentrates on making tests and experiments.

In retrospect, the deputy director of the research office of the general satellite design department of the Chinese Academy of Space Technology and head of the flight group for the first Chinese experimental communications satellite, Li Hua, said that in the mid 1970's, the launching outline approved by the central authorities had explicitly defined the aim of the launching of this satellite as follows:

--To test the mechanical environment of the satellite carrier rocket as well as its adaptability to the space environment;

--To test the measuring and controlling capabilities of the big testing loop between satellite and ground in terms of speed, position, and orbit;

--To test the communications capability of the satellite transmitters in terms of television, telephone, radio, and facsimile;

--To test the work life of satellites in a space environment.

Practice over the last 3 years has proved that these four aims have all been accomplished. Judged only by the position, orbit, and speed of this satellite, as well as by the timing for experimental communications, and so on, we can say that this is a successful earth synchronous satellite.

This satellite has 10 systems altogether, of which the telemechanical engine system successfully fulfilled its missions before the position of the satellite was fixed. Seven of the other nine systems are service systems, and only the transmitters and antenna are for experimental communications and trial service. Over the last 3 years, together with the other departments concerned, China's satellite manufacturing units have conducted many tests on the satellite itself, like interference of communications signals with monitoring receivers, interference with monitoring signals during the periods of earth shadow around the spring and autumnal equinoxes, changes in apparatus and equipment from the standby to the application state, soft functions of the transmitters, as well as exercises in trying big planetary-ground loops and correcting orbital inclinations. Some of these tests were determined before the satellite was launched and some were added after the occurrence of abnormal phenomena in operation. All these tests have basically attained their aims. Some of the results of these tests have been applied to satellites of the next generation. For example, correcting the orbital inclinations of the first experimental communications satellite provided information to correct the orbital inclinations of the second communications satellite, launched in February of last year, making the latter improve the precision of its North-South position by one quantitative grade. They have not only discovered the law governing changes in orbit and position of the small axial satellite engine in the state of continuously jetting air, but also reached the conclusion that correcting the orbital inclinations in the state of directional antenna does not result in losing antenna lock as well as the signals, thus affirming that correcting orbital inclinations will not disrupt communications.

This satellite launched 3 years ago is the first synchronous satellite as well as China's first long-life satellite. The life of the satellites manufactured in the past was designed to be around 6 months at most. To design the long-life satellites, people had to consider many new issues, such as calculating the fuel needed in correcting the various errors in long-term operation, analyzing radiation-induced damage and component reliability, testing temperature changes caused by the aging of the temperature-controlled coating, analyzing the impact of attenuation in the capability of the power system as well as the property changes of the various nonferrous materials, and so on. The actual operation of this first experimental communications satellite since its launch into space has tested these designs and measures and obtained valuable information for the design and manufacture of future long-life satellites. Judged by the present adaptive analytical parameters, apart from a small number of parameters which have exceeded the limits due to problems with the adaptive systems, most adaptive parameters are normal. This shows that all the satellites systems are still basically in an excellent condition. Orbital tests were conducted on the transmitters on eight occasions,

judging from recent results of these orbital tests, except for the real testing value of the equivalent omnidirectional radiation efficiency, which has dropped slightly, the changes in the other parameters are not great.

For the past 3 years, the satellite test systems have been coordinating very well with ground test stations to complete various testing tasks. It has always been under good control and the phenomena of issuing wrong directives and serial directives in controlling position, orbit, and speed, channel changes, or issuing directives, never occurred. This also shows that the satellite control systems functions have always been normal over the last 3 years. The provision of the de-spin control in the directional antenna has been always very high. Storage box pressure over the last 3 years shows that the satellite power system has also stood the test. Over the last 3 years, during the six earth-shadow periods (each lasted 45 days and totalled 270 days) the adaptive parameters of the storage batteries concerned were all very normal. Over the last 3 years, although the solar batteries have weakened a little, the present power supply and voltage are still relatively stable.

In the aspect of temperature control, all the parameters over the last 3 years have also been normal. The temperature-controlled ranges are all within the designed values. Only once did the temperature of the de-spin components slightly exceed the higher limit of designed temperature, but was still within the designed overmeasure range. The satellite structural system is also very stable. Notwithstanding that the varied nonferrous materials were used for the first time in a satellite, the 3-year constant operation has proved that their properties changed very little. Thousands of electronic components have also stood very vigorous tests.

It is also a first attempt for China to exercise orbital management. China did not have any previous experiences at all in compiling the requirement and management documents and handling and collecting the management data as well as in the exchange of materials and information among the application, management, and satellite-manufacturing departments. Through joint efforts and mutual cooperation by the vast numbers of space workers of all the systems, departments, and units over the last 3 years, they have successfully accomplished the task of exercising satellite orbital management. Meanwhile, they have both trained and cultivated a large number of professional technical personnel and accumulated a large number of first-hand materials for monitoring satellites in orbit and the equipment in satellites and set up relatively complete data archives. These are extremely valuable for the analysis of the first experimental communications satellite itself as well as the design and manufacture of future long-life satellites.

The Communications and Broadcasting Tests Were Praised

Over the last 3 years, this experimental communications satellite has also smoothly made varied tests and trials, such as starting digital and analog telephone services, transmitting TV and radio programs, facsimile transmissions of photos and texts, transmitting data, and so on. These efforts were well received by users at the Ministry of Radio, Cinema and Television, Ministry

of Water Resources and Electric Power, State Seismological Bureau, XINHUA NEWS AGENCY, and so on. In May 1984, the Satcom ground stations in Beijing, Urumqi, and Kunming were put into operation. By the end of the same year, the Lhasa ground station also started functioning. It has not only connected the telephone line from Beijing to Urumqi, Lhasa, and Kunming but also the communications lines from Chengdu to Lhasa and Kunming and from Lanzhou to Urumqi.

During the last 3 years, the departments concerned at the Chinese Ministry of Astronautics Industry, Ministry of Electronics Industry, Ministry of Radio, Cinema and Television, State Bureau of Weights and Measures, Chinese Academy of Science, Commission of Science, Technology, and Industry for National Defense, Signal Corps Department of the PLA General Staff Headquarters, and the naval units, have also done a lot of testing and verification work, of which the main tests were digital telephone transmission, radio and TV transmission, emission of standard time and frequency, multiple code addresses, computer communications, single channel and carrier wave, structure of distribution according to need, transmission of signals from long-distance program-controlled exchanges, and new-type stations and equipment.

This communications satellite is also undertaking trial services transmitting of radio and TV programs, including one channel of color TV programs and 15 channels of radio programs. These services have changed the situation whereby the remote areas like Urumqi and Lhasa could not receive Central TV Station programs on the same day. During the 2 years from May 1984 to May 1986, this satellite has successfully fulfilled the live TV transmission tasks to the abovementioned areas covering the ceremony in celebration of the 35th anniversary of the country, the Sixth National People's Congress, the Olympic Games held in Los Angeles, the activities in celebration of the 20th anniversary of the establishment of the Xizang Autonomous Region, and the 30th anniversary of the establishment of the Xinjiang Uygur Autonomous Region, as well as activities celebrating important festivals like new year, Spring Festivals, and so on.

The users from the Ministry of Radio, Cinema, and Television, Ministry of Water Resources and Electric Power, and so on, have said that practicing their use of the first China-made experimental communications satellite to carry on their communications and broadcast services over the last 3 years has shown that this satellite is technically successful. All the targets have basically attained the designed requirements and the communications and television transmitters can work steadily and perfectly. It has displayed an active role and obtained remarkable social effectiveness in relieving communications difficulties in the remote areas, resolving many knotty problems for the Ministry of Water Resources and Electric Power with power transmission, strengthening the ties between the central authorities and localities, promoting national unity, and developing political, economic, and cultural building in the remote areas.

Rhings To Be Improved in the Future

Being an experimental satellite, the first Chinese communications satellite naturally has some inadequacies to be improved. As compared with the weight

of the satellite, its effective load transmitters are too few and are not advanced. After experiencing two major interferences in the external charged environment, in a period of time the reading of some of its adaptive parameters became incorrect and the spiral electrical pressure in the travelling wave tubes fluctuated. Notwithstanding that these abnormal phenomena did not disrupt the communications mission of the satellite, they are issues to be improved in satellite design. Judged by its present conditions, this satellite can still continue to work for a considerably long period of time in the geo-stationary orbit beyond its designed lifetime.

/6662

CSO: 4008/59

NANCHANG DEVELOPING NEW FIGHTERS, ANTISHIP MISSILES

HK140807 Hong Kong TA KUNG PAO in Chinese 14 May 87 p 16

[Article by Yin Jun [3009 6511]: "Nanchang Aircraft Manufacturing Company, the 'Cradle' of China's Fighter Planes, Develops Various Types of New Missiles"]

[Text] The Nanchang Aircraft Manufacturing Company is one of China's biggest aircraft manufacturing enterprises. To a certain degree, it represents the capacity and level of China's aeronautics industry.

The company was established in April 1951. At the beginning, it was just a small airplane repair shop. Three years after the plant was set up, it produced new China's first airplane and 4 years after that, China's first self-designed plane--the "Chujiao-6"--was born in this factory. In the late 1960's, this factory again produced China's first supersonic jet fighter--the "Qiang-5." In the past 30 years and more, the company has developed and produced many different kinds of military and civilian aircraft, and its products have also been sold to many foreign countries and regions.

The company has more than 10,000 workers and has a first-class scientific research force and advanced technology and equipment. In the assembly shop, one hears the roar of aircraft engines and sees the shining "Qiang-5" fighters lined up. Engineers are busy at work. A fuselage moves slowly to the assembly line under electronic control. This type of aircraft adopts the design of lateral air intakes and is equipped with advanced radar and other electronics systems. The plane can make sideward rolls at an altitude of 60 meters and can fly at a superlow altitude of 20 meters. In 1982, this aircraft was featured in Jane's aircraft yearbook, and became the first type of Chinese aircraft to be carried by an international aircraft yearbook.

At present, the company produces four models of "Qiang-5" attack fighters, namely, "Qiang-5-I," "Qiang-5-II," "Qiang-5-III," and "Qiang-5-M." Among them, the "Qiang-5-III" and "Qiang-5-M" are exported to other countries. Last September, China participated in an international air show in Britain, where a model of this aircraft attracted close attention from international aircraft manufacturers and purchasers. In June this year, "Qiang-5" will again be exhibited at an international air show in Paris. This will be the first time that China will exhibit military aircraft at an international show.

A few years ago, China began to export its military aircraft. So far, the Nanchang Aircraft Manufacturing Company has received officials and military leaders from scores of foreign countries, and all were amazed at China's high capacity and level of design and manufacturing.

Apart from making aircraft, the Nanchang company also produces different types of missiles. In the missile assembly shop, one sees lines of long missile bodies. This is a new type designed by the company and is mainly used to attack large naval targets. They are radar-guided supersonic ship-to-ship missiles with advanced electronics anti-jamming systems. When the missile is flying at a supersonic speed, its solid rocket engine will automatically drop, and the missile will be propelled by the liquid rocket propeller inside its body and then maintain the supersonic speed until it hits the target. These missiles can be easily converted to land-based or air-launched missiles. In the company, colorful pictures beautifully printed are displayed. They are part of the advertisements for this type of missile which will be exhibited at the air show in Paris in June.

A major task for this company in the future is to develop and produce all kinds of military and civilian aircraft for export and to open the international markets for its products. At present, the company is designing and developing some new-type aircraft.

Because the outside world knows little about China's military industrial capacity, China for the first time sent an aircraft industrial delegation last September to participate in an aircraft exhibition in Britain, where China exhibited a full range of aeronautics products (mainly models). The Chinese exhibits showed a completely new look to the visitors. In June this year, China will exhibit three real aircraft at the Paris air show and this will enable foreign clients to more clearly understand the real capacity and level of China's aircraft industry.

/6091

CSO: 4008/61

CHINESE CHARACTER INPUT SYSTEM SCHEMES DESCRIBED

Beijing DIANZI XUEBAO [ACTA ELECTRONICA SINICA] in Chinese Vol 15, No 1,
Jan 87 pp 31-35

[Article by Wang Xiaolong [3769 2556 7893], Harbin Institute of Technology: "The Optimization, Standardization, and Development of Chinese Character Coding Schemes"; manuscript received May 1985, revised in November 1985; first paragraph is source-supplied abstract]

[Text] Abstract: On the basis of an analysis of user needs, system working conditions, and the practical life for coding schemes, this paper explores the selection, optimization, and progressive standardization of Chinese character coding schemes, as well as problems with development trends; it describes some methods that may be used and gives a concrete example.

I. Presentation of the Problem

With the dissemination and application of computers, research into Chinese character coding has grown rapidly, and in this country alone there are more than 400-500 of them. But as of this time, society has yet to pass judgement as to which are the best. Many plants have been forced to accept various methods for input and selection to suit different users. For many schemes the distinctions between them are vague, functions are similar, and there are conflicts when standardizing them, and when to that is added the fact that viewpoints among users and also among plants are not uniform, this has led to some confusion at present regarding coded input schemes for various Chinese character systems. This has obstructed the further growth of efforts in processing Chinese textual information. For this reason, an exploration of the varied origins for coding schemes, studies into how to design and select better input schemes, and to then go on to bring about the general use and standardization of coding schemes have become problems in urgent need of resolution.

II. Appropriate Conditions for Coding Schemes

Studies for the earliest Chinese character coding schemes were undertaken in terms of the characteristics of the Chinese characters themselves, and these studies sought a one-to-one correspondence (no duplicate codes) between the Chinese characters and the coding (no duplicate codes) to the greatest degree

possible, as well as the shortest possible equal code length (number of key strokes). Recently, people have realized that the input of Chinese text is a complex system that involves various factors. The degrees of emphasis for these factors are not the same, which leads to diversity in coding schemes. In the end, coding schemes must be based upon applications. For this reason, it is necessary to begin our analysis from the conditions appropriate to a coding scheme or from the scope of application.

A. Analysis of User Needs

Because the habits, background, and quality of work of users is not the same, there are all kinds of differences regarding the needs for coding schemes. These may be largely encompassed by the following types:

1. There are differences in likes and dislikes regarding the types of coding schemes.

From the point of view of the characteristics of the Chinese characters themselves, aside from the pipeline characters, these may be divided into coding schemes based on pronunciation and those based on shape. Each type has its adherents.

2. There are different needs regarding time for learning the coding and speed of input.

By time for learning the coding is meant the time needed from when learning the code begins until the user can input characters using this code without a code book. Because the degree of complexity regarding the graphic structure of Chinese characters is a definite quantity, under similar conditions, whatever the scheme there will be a certain inherent relation between the code learning time and the speed of Chinese character input. Generally speaking, when the learning time is short the input speed is slower, and when the learning time is longer the speed of input is quicker. Beginners invariably seek the shortest learning time, but professional operations personnel are more interested in input speed and are not particular about time needed for learning. Others are somewhere between these positions. The majority of users are in favor of the schemes that are easiest to learn.

3. There are differences in the requirements for progress from former input levels.

After mastering a certain input method, some users are satisfied, but there are those who expect to leave a certain margin in which to gradually improve their level of input. When necessary, they can continue with advanced study on their existing basis.

B. Limits on the Period of Use for a Coding Scheme and Development Trends

The life span for a Chinese character coding scheme can include the stages from its planning, analysis of needs, definition, design, application, and maintenance, until its obsolescence. Even though there are very many coding schemes at present, some schemes have not yet entered the stage of

applications, and some schemes that have been used have been found to be inappropriate, needing greater revision and maintenance. The optimization of coding schemes should be diligently pursued from the planning and needs analysis stages, and in addition, coding rules should be in keeping with the developments of science and technology.

Input conditions for Chinese characters may be as represented in figure 1. From the point of view of the development of coding schemes, at first people looked for a one-to-one correspondence between the Chinese characters and their codes, and there were once discussions about optimal coding and duplicate coding rates of zero. But a lesser number of keystrokes is certainly not the equivalent of fast input speed. The time needed for manual decoding is for the general user usually much greater than the time for keystroke input. And as methods for machine automatic recognition of duplicate characters and interactive recognition of duplicate coding develop, then methods that rely solely on defining non-standard codes to reduce the rates of duplicate codes will be gradually discarded by users because they increase the amount of mental effort needed. The importance of duplicate coding has gradually been diminishing. The relations between Chinese characters and their codes has gradually gone from a one-to-one correspondence to a one-to-many, or even to many-to-many relations. There is less and less work to be done at the state of manual decoding, rules are becoming simpler and simpler, while the computer is doing more and more of the decoding. Research into allowing users to use fault-tolerant codes, to use multiple sounds, multiple meanings, and multiple form coding, as well as glossary coding and pure tone codes are representative of this trend. The optimization and unification of coding schemes will also suit these developments. Basic coding standards should pay attention to the primary part of Chinese character characteristics, should simplify them as much as possible, and should be stable for a long time, which will lower the rate of knowledge obsolescence.

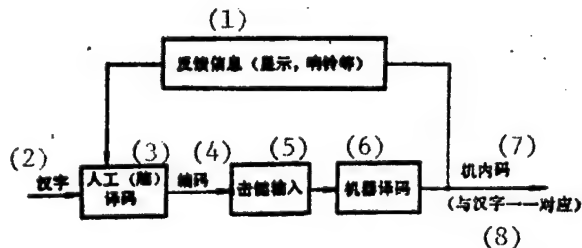


Figure 1. Schematic for Chinese Character Code Input

- Key:
1. feedback information (display, bell, etc.)
 2. Chinese character
 3. manual decoding
 4. code
 5. keystroke input
 6. machine decoding
 7. machine code
 8. (one-to-one correspondence with Chinese characters)

C. The Effects of System Working Conditions

Generally speaking, schemes with the lesser amount of manual decoding have a higher cost, and therefore the application conditions for coding schemes will be affected by factors such as system costs. For example, for low-level systems where the number of Chinese characters to input is not great, even if pipeline codes are used that are hard to remember (as for example international zone coding), customers will still be found. But for general systems with greater quantities of characters to input, the amount of system resources needed will at times determine whether or not a particular system can be used. And this is especially true for intelligent high-quality schemes (like tone coding input and Chinese character model recognition) that are both quick in input and easy to learn. This is because of excessive computer time required and the amount of memory needed. Currently, these are still only in the research stage. As computers develop within all fields, users will regularly run into different working conditions. This requires that the coding schemes used by all levels of Chinese character systems be as uniform or as typical as possible.

III. Analysis of the Feasibility for Unifying Coding Schemes

There is a certain amount of work going on in this country in this area, as for example with the formulation of coding evaluation rules, initial evaluations of coding schemes, etc. Using the rules of the marketplace, if coding schemes are allowed to compete freely, the best is certain to survive while the worst will die out. But analyzing this from the point of view of the appropriate conditions for a coding scheme, we need to establish a general input system that can be used under various input working conditions and that is appropriate to coding development, and that also satisfies the needs of various users. Any one or two coding schemes will be hard put to satisfy those requirements, but we can propose a series of schemes, where each scheme is suited to a particular working condition or that satisfies the needs of a particular kind of user. At the same time, this would allow for mutual compatibility between these schemes, where the rules in one scheme would either be common among all schemes or would not conflict with other schemes. When users change from one working environment to another, there would generally be no change in coding input rules. Through this we would gradually achieve generality and standardization in coding input schemes. The work that needs to be done could be considered from the following aspects:

A. Categories are unified, and similar schemes are brought into a series.

Other than pipeline codes, coding schemes may be divided into the two types of shape codes and phonetic codes. The romanization scheme belongs to the phonetic type of coding. Similar coding would be merged and optimized. For the sake of beginners, and different types of general users and professional operators, schemes would be provided having different levels. The key would be in guaranteeing compatibility between the rules for each scheme and its extendibility.

Example: the romanized prompt method is currently one of the more commonly used schemes. But its input speed is not fast, and it is only used for

beginners. After prompting, the signifier that the usual system requires the user to enter is only a sequential number or a letter [1]. This is of no use to the user in progressing to improve his level of input. It is not as good as defining the prompt symbol to be the code for a higher level coding scheme. This allows the user to unconsciously become familiar with some usages of higher level schemes while operating low level schemes. Also, the prompting method can also be used to display and check the coding book for higher level schemes, which aids the user in learning and using them (see table 3).

B. Seek what is similar while preserving the differences, and rules should be simple and not too detailed.

Because the characteristics of Chinese characters are known, the starting points for many coding designs are similar. The distinctions are only in the differences in degrees of emphasis on certain indicators (such as rates of duplicate characters). For these schemes, it is possible to unify the essential or primary portions. Areas that are different may be left to each scheme to resolve uniquely. In different working environments, users need only understand the special provisions of the moment, while in most aspects the schemes will be uniform. In this way we can make things much easier for users, and can expand the general usefulness of schemes.

Example: the differences among the various schemes that code by sound are primarily in how they use shape coding to distinguish similar words (of the same tone). Schemes are different because of the way people have dealt with information about the initial strokes, the radicals, the repeated components, and the meanings. The majority of schemes among these use the radicals and the initial strokes. But there are different ways of using radicals and initial strokes. If we do not place so much emphasis on rates of identical codes, we could formulate simple rules along these lines to represent shape codes.

If a Chinese character can be separated into components, use the initial consonant (if no initial consonant, use the first letter of the spelling) of the pronunciation of the largest component that includes the initial stroke, and if the character cannot be broken up, use the initial consonant of the pronunciation of the initial stroke.

For example: use 'm' for the shape code of the character [4907] [made up of 3 components, the first one of which would be pronounced "mei"]; for [1899] use 'm' [the first component of the full character is the lesser character "men"]; use 'P' for [0707] [the first stroke of this "indivisible" character is pronounced "pie"]; for [0079] use 'd' [the first character of this "indivisible" character could be pronounced "dian"]

These rule models are simple, quick in response, and basically express the thinking behind the usage of shape coding in the majority of sound coded schemes. In table 1, we can see from the character coding of the basic components of some common radicals as taken from the "Xinhua Zidian" in keeping with this rule, that the usage of shape coding in many schemes has many similarities. We might as well use this as a general rule for shape coding in sound codes. According to statistics, just this rule alone would

allow the rate of Chinese character duplicate codes to drop below 3 percent. As for the remaining duplicate coded characters, these can be resolved by using methods such as computer automatic elimination of duplicates, interactive elimination of duplicates, the definition of special rules, and simplification rules in accordance with the different needs of various schemes.

Similarly, the rules for disassembling components in shape codes could be unified.

C. Correspondence comparison, and merging similar items to the greatest extent possible.

There is a lack of lateral associations among the designers of many schemes, which leads to an inability to reach a consensus regarding a description of the same thing. An analysis could be made of the working environments for various schemes and uniform methods of expression could be found that are adapted to the application environments of various schemes.

Example: to reduce the number of keystrokes for sound codes, many schemes use abbreviated codes to represent romanization. For example, dual phonetics or triple phonetics (consonant, medial, rhyme), but the representation methods for each scheme are not all the same. One kind of corresponding relation is provided in table 2. It can be seen that for any given final (or character string) there is a letter that is an abbreviated code, which is essentially the same as with other systems, only the corresponding relations are changed. Therefore, it is quite possible to make uniform the abbreviated codes. What must be taken into consideration is to follow as much as possible the application environments for various schemes and make the abbreviated codes and their corresponding finals as easy to remember as possible.

Similarly, the coding for common components in the various schemes for shape codes could also be made uniform.

IV. Actual Examples and Results

To explain the feasibility of the ideas just expressed, we give a brief example--a sound consonant series code (see table 3). In this, the first five schemes have already been implemented on the FM-8 microcomputer. The software and data (dictionary, etc.) for the first four codes for the first level of Chinese characters and some from the second level take up less than 10K of memory. User response has been good. The conditions under which the sixth scheme is realized have been readied. Actually, the seventh code is a scheme that translates romanization into Chinese characters. There is nearly no need to provide any other coding rules, it is easy to operate, and it is quick. Also, the preconditions for implementing sound input are gaining more respect each day. As the disciplines like electronic devices develop so dramatically, the conditions for developing sound coding will also mature.

Table 1. Shape Codes for Common Units Derived from Shape Code Rules

Shape Code	Corresponding Unit	Shape Code	Corresponding Unit
形码	所对应的部件	形码	所对应的部件
b	ㄥ(ㄥ)八(ㄨ)比贝白鼻	n	女牛(牛)鸟
c	草(艹)寸采	p	片片撇(,)
d	刀(刂, ㄅ)点(丶)大斗歹豆	q	气犬(犭)欠青其
e	二耳(阝, 卩)	r	人(亻, 亻)日(日)
f	方风文	s	四厶丝(纟, 系)
g	广弓工戈瓜且鬼骨	t	田土(土)
h	火户横(一)禾黑	u	石十士尸矢身食(饣)
i	厂车赤辰齿	(sh)	示(示)
(ch)		v	止爪佳直(乚)
j	巾见金(钅)几(儿)巳角	(zh)	
k	口	w	文王韦瓦弯(乚, ㄣ, ㄣ)
l	力立龙里鹿	x	小夕穴心(忄)辛
m	门乌木毛毋皿矛麦	y	尤月义业鱼音雨言(讠)衣(衤)
		z	足(足)子(子)走(辶, 走)

Table 2. A Comparison Table of Abbreviated Code Finals (Character Strings)

abbrev. code	final	abbrev. code	final
韵母	韵母	韵母	韵母
a	a	n	ia, en
b	ai	o	o, ua
c	ao	p	ing
d	an	q	uo
e	e	r	iong, ong, er
f	ang	s	üan, uan
g	eng	t	uen, un, ün
h	ou	u	u
i	i	v	ü, uei, ui
j	ie	w	ion, iu
k	ei	x	iang, uang, ueng
l	ian	y	üe, ue, uei
m	in	z	iao

Table 3 Sound Series Codes; An Explanation of Some Features of Schemes

Coding Scheme	Time to Learn	# of Characters Input per Minute	Key-strokes per Character	Cost	Basic Rules	Example:
						ang [2491] yi [6231]
Spelling Prompt	a few minutes -- an hour	1 -- 10	4 -- 8	low	input spelling, ^t and symbols on screen	ang ^t 2r yi ^t 46
Abbrev. Code Prompt	a few hours -- 2 days	2 -- 20	4 -- 5	low	input abbreviated code, ^t and symbols from screen	f ^t 2r i ^t 46
Sound code	few hours -- several days	3 --> nearly 100	3 -- 10	rather low	input spelling or abbreviated code, tone (1,2,3,4) and the consonant of unit having 1st stroke of char	f 2r, i 4y (computer knows duplicates) or i 4y ^n
Sound Full Code	a few days -- some weeks	5 --> more than 10	3 -- 4	rather low	if no duplicates, same as above; if duplicates input unique defining code	f 2r i 46
Phrase Code		dozens or several 100	0.01 -- 1.5	med.	defined by system or user	
Sound Class Long Code			3	med.	eliminate tone portion from sound code, use abbrev. code	afr yiy
Spelling Code			2 - 3	high	sound code minus initial conson.	af2 or f2 yi4 or i4

References

- [1] Xu Jialiang [6079 1367 2733]. "The 'Spelling--Prompt' Chinese Character Coding Scheme Closely Related to Research in Computers and Peripherals." DIANZI JISUANJI DONGTAI [COMPUTER DYNAMICS] No 7 pp 44-47. 1980.
- [2] Shi Guiqing [4258 6311 7230] and Xu Bingzheng [1776 4426 6927]. "Distribution of Chinese Characters and Problems with Optimal Coding and Input." DIANZI XUEBAO No 4 pp 94-97. 1984.

[3] Wang Xiaolong. "Chinese Character Input Systems and Serial Codes."
JISUANJI YANJIU YU FAZHAN [COMPUTER RESEARCH AND DEVELOPMENT]. 1985.12.

[4] Liu Yuan [0491 3293]. "Compendium of Chinese Character Coding Schemes."
Science and Technology Documents Publishing House. P 104. 1980.

[5] Guo Yefang [6753 0396 2455]. Papers from the International Research
Conference on Chinese Textual Information. China Chinese Textual Information
Society. Pp 1-14. 1983.

12586

CSO: 4008/1058

IF STATEMENT LOOP VECTORIZATION ALGORITHM DESCRIBED

Beijing DIANZI XUEBAO [ACTA ELECTRONICA SINICA] in Chinese Vol 15, No 1,
Jan 87 pp 24-30

[Article by Fan Zhihua [5400 2784 5478], Changsha Institute of Technology:
"Re-recognition Algorithm for Vectorization of Loops With IF Statements";
manuscript received October 1985, and revised March 1986; first paragraph
is source-supplied abstract]

[Text] Abstract: A re-recognition algorithm is developed for vectorization
of loops with logical IF statements and block IF statements. Many of fairly
general and complicated loops are successfully decided to be vectorizable,
and they will reach their separate vectorized object program segments, if
this algorithm coordinates with the rewriting technique.

I. Vector Supercomputers and Methods for Structured Programming Design

Configured vector mechanisms are the primary forms for supercomputers [1],
and therefore serial arithmetic vectorization has become an entirely new
subject within the domain of computer science. Because structured program-
ming design methods are recognized throughout the world and are also scien-
tific methods for program design used everywhere, theoretical research and
engineering implementation of vectorization are expansions of the basic
models in light of those methods.

The connected form, selective form, and repetitive form are three types of
basic routine models. By using just these three models we can compose pro-
gram structures of all types and can solve or process real topics of all
complications, the basic theorem of structured programming [2-4]. In the
FORTRAN language, the connected form is manifested as sequential executions
of statements (see Figure 1); logical IF statements and single-branch block
IF statements are manifested in the selective form as shown in Figure 2(a);
dual-branch block IF statements are manifest in the selective type shown in
Figure 2(b); and the repetitive form is manifest as DO statements (Figure 3).

Vectorization theory has already resolved the vectorization problems for the
three basic models just mentioned [6-11], and consequently this has opened
avenues for all the routines in the highly efficient execution of "good
structures" for vector supercomputers. IF statement vectorization

engineering has exhibited a very important significance for uncovering the parallel potential for vector supercomputers.

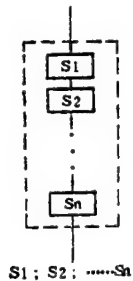


Figure 1. Connected Type Basic Model

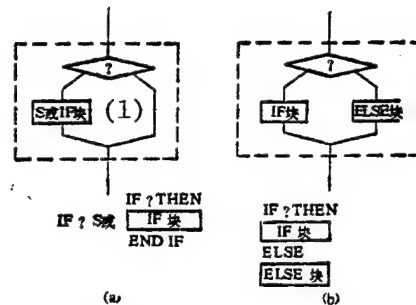


Figure 2. Selective Type Basic Model

Key:
1. S or IF Block

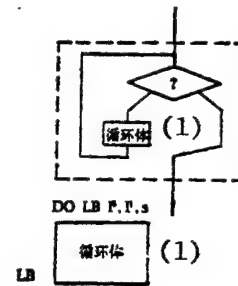


Figure 3. Basic Model for Repetitive Type in DO Statements

Key:
1. Loop

II. Basic Theory Regarding IF Statement Vectorization

Definition 1 [7]. For any DO loop. If for the first part $IF(e_i)$, the block IF statements $IF(e_i)$ THEN, and ELSE $IF(e_i)$ THEN of the logical IF statement is substituted the logical data scratch statement $\#E(I) = e_i$, then after rejection of the ELSE statement, END IF statement, and CONTINUE statement you will get an A loop [8], and we then call the former loop an IO loop and say that the A loop is its closed form.

We now present a typical example of an IO loop.

Example 1. The DO 512 loop of Example 5 in Reference [7], the closed form of which is DO 52.

Example 2.

```
DO 11 I=M, 0, 2
  A(I)=1-B(I)*C(I)
  IF (B(I).EQ.C(I)) THEN
    IF (A(I).GT.(B(I)+B(2*I)))A(2*I)=2*C(I)-B(I)
    IF (A(3*I).LT.(C(I)+C(2*I)))A(3*I)=3*B(I)-C(I)
    A(4*I)=B(2*I)+C(2*I)-A(3*I)
  END IF
11 CONTINUE
```

the closed form for which is:


```

DC 12 I = M, 0, 2
A(I) = 1 - B(I) * C(I) + A(I)
#BC(I) = B(I).EQ.C(I)
#AB(I) = A(I).GT.(B(I) + B(2 * I))
A(2 * I) = 2 * C(I) - B(I)
#AC(I) = A(3 * I).LT.(C(I) + C(2 * I))
A(3 * I) = 3 * B(I) - C(I)
12 A(4 * I) = B(2 * I) + C(2 * I) - A(3 * I)

```

Example 3.

```

DO 13 I = 1, 10
IF (E(2 * I - 1).EQ.A(I)) THEN
A(I) = E(2 * I + 1) * * 2
A(2 * I + 10) = F(I - 1) + 3 * A(I)
ELSE IF (A(2 * I + 10).LT.B(I)) THEN
A(2 * I + 9) = 5 * A(I) - F(3 * I)
ELSE
G(3 * I - 1) = A(2 * I + 9) * A(I) * * 2
G(3 * I) = A(I) + A(2 * I + 10)
END IF
13 G(3 * I - 2) = 2 * A(2 * I + 10) - A(2 * I + 9)

```

the closed form for which is:

```

DO 14 I = 1, 10
#EA(I) = E(2 * I - 1).EQ.A(I)
A(I) = E(2 * I + 1) * * 2
A(2 * I + 10) = F(I - 1) + 3 * A(I)
#AB(I) = A(2 * I + 10).LT.B(I)
A(2 * I + 9) = 5 * A(I) - F(3 * I)
G(3 * I - 1) = A(2 * I + 9) * A(I) * * 2
G(3 * I) = A(I) + A(2 * I + 10)
14 G(3 * I - 2) = 2 * A(2 * I + 10) - A(2 * I + 9)

```

Theorem 1 [7]. For any IO loop and its closed form, they constitute a weak-strong loop pair [10].

Theorem 2 [7]. Given a closed form vectorizable IO loop. In the vectorization target program of the closed form, if the portions generated by the domain of the same IF statement can all precede the corresponding logical data scratch statement, then that IO loop can be vectorized.

III. Re-recognition Algorithm for IF Statement Vectorization

As described in References [6] and [7], the vectorization process for IO loops is: construct the closed form, recognize and rewrite the closed form, then recognize and rewrite the vectorization target program for the closed form into the vectorization target program for the original IO loop. We call the latter recognition "re-recognition," and call the latter rewrite "re-rewriting." If we continue the re-recognition, we want first to normalize the internal logic array used by the logical data scratch statement, the generation method for which is: first add a "#" sign as the sign for internally defined, then add the letter "L" as the sign for logical category, and at the end add a four-digit decimal unified number, that is:

Lxxxx

where xxxx is the 4-digit unified number

Then open the condition stack CONDITS, and store the jurisdiction domain for the execution conditions of each IF statement. This includes four data items: START--the sequence number of the start statement in the closed form; SHIFT--the sequence number of the shift statement in the closed form, where 0 indicates that there is no defined value Ω ; FIN--the termination statement sequential number in the closed form; and CONDITION--the unified number of the corresponding internal logical array. The Pascal data structure of this would be:

```
TYPE CLINK = ↑CONDITS,
      CONDITS = ARRAY(1:CN) OF RECORD
        START,
        SHIFT,
        FIN,
        CONDITION:INT
      END
```

In the process of the simplest form of the constructed closed form loop [3], the contents of this stack are filled in at the same time. In this kind of data structure, it is easy for us to write a re-recognition algorithm.

A re-recognition algorithm for IO loop vectorization

Input: Relate the closed form of the table OST in the target program with the CONDITS stack.

Output: Assertion whether or not to vectorize.

Steps: 1. OST1 = ϕ ; OST2 = OST.
2. OST2 = ϕ ? If so, can be vectorized, stop; else:

3. SN = HD(OST2); (note: HD--head of the fetched string)
 OST1 = OST1 ∪ {SN};
 OST2 = TL(OST2). (Note: TL--tail of the fetched string)
4. Is this a logical array scratch statement? If not, jump to 2;
 else:
5. LN = the unified number of the internal logical array.
6. Traverse CONDITS stack? If so, jump to 2; else:
7. Fetch the next CONDITS item.
8. LN = CONDITS.CONDITION? If not, jump to 6; else:
9. [CONDITS.START, CONDITS.END] ∩ OST1 = ∅? If not, cannot be
 vectorized, stop; else, jump to 6.

Here the data structure OST1 is a set, used to store the number of the scanned statement; OST2 is a string, used to store the numbers of statements awaiting scanning; SN stores the number of statements currently being scanned; LN stores the unified number of the internal logic array.

IV. Prior Principle for the Logical Data Scratch Statements

As shown in Example 17 of Reference [8], the target program tables for A loops have a certain arbitrariness. When the discriminant theorem [7] is used on the closed form of the A loop, this arbitrariness will affect the assertion regarding the vectorization of the original IO loop, even to the extent that some loops that could originally be vectored will not be able to be vectorized. To avoid the occurrence of this phenomenon, we must introduce "the prior principle for logical data scratch statements," that is: unless forced by direct offspring relations and regeneration relations [10], logical data scratch statements should be as forward as possible in the target program. What follows is an example using this principle.

Example 4.

```

DO 15 I=1, N
  A(I)=1
  IF (A(3*I+1).LT.0) THEN
    A(2*I)=2
    A(3*I)=3
  END IF
15 CONTINUE

```

the closed form for which is:


```

DO 16 I=1, N
A(I)=1
#L0005(I)=A(3*I+1).LT.0
A(2*I)=2
16 A(3*I)=3

```

Table 1 lists the contents of the CONDITS stack.

Table 1. Contents of CONDITS Stack for DO 15 Loop

START	SHIFT	FIN	CONDITS
3	0	4	5

A sequential level segment for the closed form is shown in Figure 4.

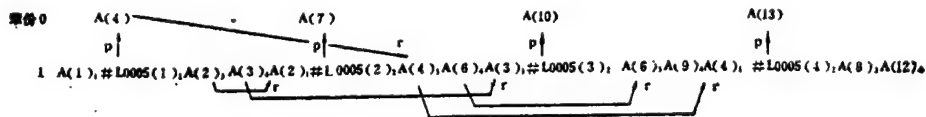


Figure 4. Sequential Level Segment of DO 16 Loop

When doing equivalence conversion on Figure 4 [11], according to the principle of the priority of logical data scratch statements, priority is given to the left shift of the node in the second statement, where the top left connection succeeds. This outputs the target program table OST = <2, 4, 3, 1>

Enter this algorithm. At 3, SN = 2, OST1 = {2}, OST2 = <4, 3, 1>. At 9, [3,4] ∩ {2} = ∅. From 6 to 2 and 3, the jump from 4 to 2 is executed repeatedly, it may be vectorized, stop.

V. Real Example of Algorithm

Example 5 (continuation of Example 1)

The contents of the DO 512 loop CONDITS stack are listed in Table 2.

Table 2. CONDITS Stack for the DO 512 Loop

START	SHIFT	END	CONDITION
3	6	7	6

The sequential level segment for the closed loop is shown in Figure 5.

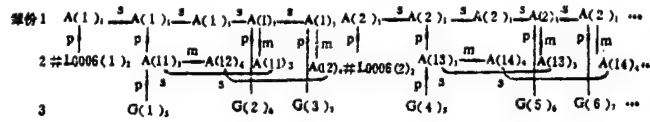


Figure 5. Sequential Level Segment for DO 52 Loop

Limited by the offspring relations, the logical data scratch statements in the second statement cannot be before the first statement. The closed form can be vectorized, where the target program table OST = <1, 2, 3, 4, 5, 6, 7>.

Enter this algorithm. When SN = 2, OST1 = {1, 2}, and OST2 = <3, 4, 5, 6, 7>, it goes from 4 to 5, where LN = 6. At 7 and 8 LN = CONDITS.CONDITION. At 9, [3, 7] ∩ {1, 2} = ∅. Jumps to 6 and 2, ... may be vectorized, stop.

Example 6 (continuation of Example 2)

The contents of the CONDITS stack for the DO 11 loop are listed in Table 3.

Table 3. CONDITS Stack for DO 11 Loop

START	SHIFT	FIN	CONDITS
3	0	7	8
4	0	4	9
6	0	6	10

We will first consider the problem of vectorization of the closed form. Because the closed form is an A loop when the absolute value of the step is not equal to 1 [8], we must still augment the step to 1.

According to Theorem 2 [8], we calculate:

$$N_1^1=1, N_2=4$$

Thereupon, the pursuit subinterval is [-4, 0], and we obtain a sequential level segment as shown in Figure 6.

We then do equivalence conversion of this sequential level segment. The nodes of the seventh statement may be lowered to the fourth level; the nodes of the sixth statement can all be lowered to the third level, to the right; the nodes of the fifth statement can all be dropped to the third level, to the left; the nodes of the fourth statement can all be dropped to the second level, to the right; the nodes of the third statement at the second level can all go to the left; at the first level, in accordance with the prior principle for scratch statements, the nodes of the second statement are put to the left, those of the first statement to the right. At this point, the level segments are standardized, and the target program table OST = <2, 1, 3, 4, 5, 6, 7>.

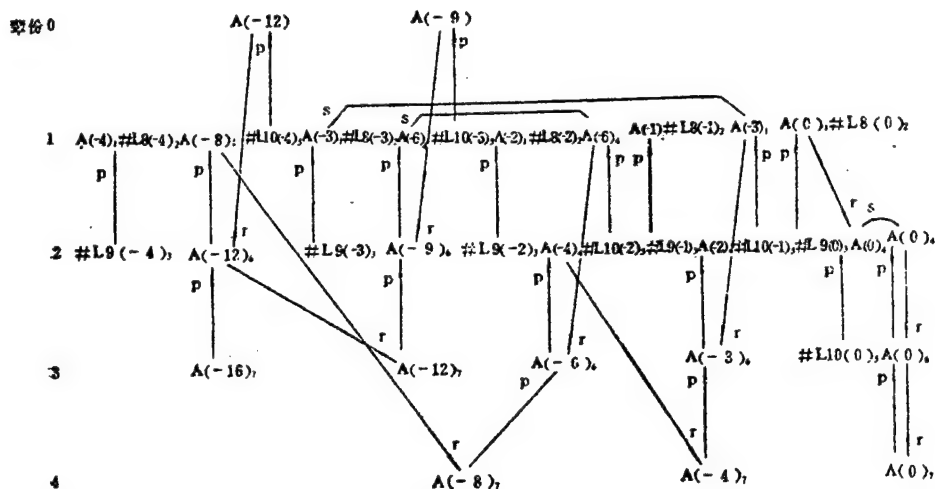


Figure 6. Sequential Level Segment for DO 12 Loop (where the internal logic array uniform number preceding 0 is omitted)

Enter this algorithm. At 3, SN = 2, OST1 = {2}, and OST2 = <1, 3, 4, 5, 6, 7>. From 4 through 5, LN = 8. At 7, fetch the first item in CONDITS. At 8, LN = CONDITS. CONDITION. At 9, [3, 7] / {2} = ϕ . Jump to 6 and 7, fetch the second item in CONDITS. Jump to 6 and 7 from 8, and fetch the third item in CONDITS. Again jump to 6 through 8, the CONDITS stack has been traversed, and the discrimination of first logical data scratch statement is completed. Jump to 2, and similarly differentiate the last two logical data scratch statements. The original IO loop may be vectorized, stop.

Example 7 (continuation of Example 3)

Table 4 lists the contents of the CONDITS stack of the DO 13 loop.

Table 4. CONDITS Stack of DO 13 Loop

START	SHIFT	FIN	CONDITION
2	4	7	11
5	6	7	12

The sequential levels of the closed form are shown in Figure 7. In the process of equivalence conversion, the original form of the fourth statement may be placed anywhere after the third statement. However, because this is a logical data scratch statement, according to the principle of priority, make this follow closely after the third statement, from which you will get the target program table OST = <1, 2, 3, 4, 5, 6, 7, 8>. Because this maintains the original sequence of the closed form, the conditions of the discriminant theorem are certainly satisfied, which is just the result produced by the re-recognition algorithm.

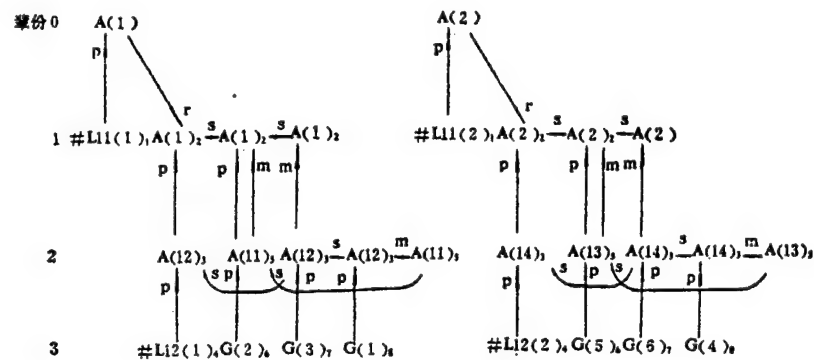


Figure 7. Sequential Levels of the D0 14 Loop (where the internal logic array uniform number preceding 0 is omitted)

REFERENCES

- [1] Fan Zhihua, "Vectorization Theory," DIANZI XUEBAO, No 3, 1986, p 102.
- [2] O.J. Dahl, et al., "Structured Programming," Academic Press, Inc., 1972.
- [3] Tang Zhisong [0781 4460 2646], "Structured Program Design and Structured Program Languages," Institute of Computing Technology, Chinese Academy of Sciences, 1977.
- [4] Zhong Cuihao [0112 5488 3032], et al., "Computer Research and Development," No 3, 1983, p 1.
- [5] F.C. White, et al., "American National Standard Programming Language FORTRAN," American National Standard Ins., 1978.
- [6] Fan Zhihua, "Research Into the Problem of Vectorization," monograph from the Sino-American Academic Conference on Computer Software Engineering, China, April 1982.
- [7] Fan Zhihua, ZHONGGUO KEXUE, Vol A, No 8, 1983, p 756.
- [8] Fan Zhihua, ZHONGGUO KEXUE, Vol A, No 4, 1983, p 380.
- [9] Fan Zhihua, ZHONGGUO KEXUE, Vol A, No 6, 1983, p 566.
- [10] Fan Zhihua, KEXUE TONGBAO, Vol 27, No 16, 1982, p 1024.
- [11] Fan Zhihua, ZHONGGUO KEXUE, Vol A, No 3, 1983, p 275.

12586/6091
CSO: 4008/1058

DEVELOPMENT OF MULLITE BRICKS FOR HOT-BLAST STOVE

Luoyang NAIHUO CAILIAO [REFRACTORIES] in Chinese No 1, 20 Jan 87 pp 23-26

[English abstract of article by Zhang Zhenquan [1728 2182 2938], et al., of Shandong Refractories Work]

[Text] Mullite bricks with M-75 sinter mullite white corundum and the addition of high quartz corundum and superior clay have been developed to meet the needs of the hot-blast stove of the large capacity blast furnace of Paoshan Steel Company. This paper introduces the processing and properties of these mullite bricks and compares them with imports.

9717

CSO: 4009/42

SEPARATION OF BASIC MAGNESIUM CARBONATE FROM MAGNESITE BY CARBONATION PROCESS

Luoyang NAIHUO CAILIAO [REFRATORIES] in Chinese No 1, 20 Jan 87 pp 18-22

[English abstract of article by Quan Hongdong [0356 1347 2639], et al., of Wuhan Iron and Steel University]

[Text] This paper reports an investigation of the treatment of magnesite and the production of basic magnesium carbonate by a carbonation process. After green roasting, the product's basic magnesium carbonate contains as much as 99 percent MgO. This newly developed process may provide an alternate approach toward production of high-purity magnesium oxide by fully exploiting China's rich magnesite resources.

9717

CSO: 4009/42

APPROACH TO IMPROVE THERMAL SHOCK RESISTANCE OF REFRACTORIES

Luoyang NAIHUO CAILIAO [REFRACTORIES] in Chinese No 1, 20 Jan 87 pp 7-12

[English abstract of article by Wang Runze [3769 3387 3419], et al., of the Luoyang Refractory Research Institute, Ministry of Metallurgical Industry]

[Text] Theories of thermal shock resistance of refractories are briefly described and strategies to improve it are indicated based on these theories. The strategies include increasing the toughness and thermal conductivity of the material and decreasing the elastic modulus and thermal expansion. The approaches to increase toughness and decrease thermal expansion are emphasized through the microstructural control of the material.

9717

CSO: 4009/42

MICROCRACK AND CRYSTAL TYPE OF ZrO_2 IN FUSTCAST ZIRCONIA-CORUNDUM REFRACTORY

Luoyang NAIHUO CAILIAO [REFRATORIES] in Chinese No 1, 20 Jan 87 pp 1-6

[English abstract of article by Chen Xianqiu [7115 7359 3061], et al., of Shanghai Institute of Ceramics, Chinese Academy of Sciences]

[Text] The structure and crystal type of ZrO_2 grains have been studied by optical and electron microscopes. The submicrocracks caused from high to room temperature transformation exist around the grains either in the ZrO_2 grains of the primary phase or in eutectoid. These are the sources causing the brick to break. The submicrocracks which develop can link up with ZrO_2 grains and cause the corundum to split into a network. Subsequently they gradually extend and can be resolved by an optical microscope. The tetragonal phase of the ZrO_2 grain has been confirmed by HTEM and EDX. It can be transformed to the monoclinic phase by electron beam irradiation due to heat induction. These results show that in order to achieve good performance of materials and economical benefits, partial stability of the tetragonal phase must be maintained through improvement of cast technology.

9717

CSO: 4009/42

INCOMPRESSIBLE THEORY OF INTERACTION BETWEEN MOVING BODIES AND VORTICITY
FIELD--FORCE ON MOVING BODIES BY VORTICITY FIELD

Mianyang KONGQI DONGLIXUE XUEBAO [ACTA AERODYNAMICA SINICA] in Chinese Vol 5
No 1, 1987 pp 22-30

[English abstract of article by Wu Jiezhi [0702 0094 0037] of the Chinese
Aeronautical Institute]

[Text] This paper, together with a preceding work, gives an incompressible theory of the interaction between moving bodies and the vorticity field. The author shows that the action of incompressible fluids on moving bodies can be attributed to the reaction of the vorticity generated by the bodies in a way precisely corresponding to that in which the bodies generate vorticity. In particular, for a uniformly moving three-dimensional body, the total force just equals the surface integral of the vectorial moment of local vorticity flux, with the remaining effects being completely cancelled. These results not only provide a deeper understanding of the mechanism of interaction between bodies and fluids, but also suggest a new possible approach toward improving the force characteristics by some local designs.

9717

CSO: 4009/41

TRANSONIC FLOW FIELD ANALYSIS FOR REAL FUSELAGE CONFIGURATIONS

Mianyang KONGQI DONGLIXUE XUEBAO [ACTA AERODYNAMICA SINICA] in Chinese Vol 5
No 1, 1987 pp 31-37

[English abstract of article by Wang Zhaoqian [3769 0340 0578] of Shengyang
Aircraft Company]

[Text] The modified small disturbance (MSD) equation is used in this paper. It is solved by the relaxed-line method. Crude and fine grid systems are used alternately in the solving process. Engquist-Osher and Jameson difference schemes are combined and the lateral relaxed-line method is used at local lines of the fuselage side. A faster convergent speed is obtained with a numerical experiment in this method. Several computing examples prove that the iterative times of the method are fewer and the computed results are in agreement with experimental ones.

9717

CSO: 4009/41

DATA PROCESSING METHOD FOR HIGH ANGLE OF ATTACK TESTING WITH ROLLING ANGLE

Mianyang KONGQI DONGLIXUE XUEBAO [ACTA AERODYNAMICA SINICA] in Chinese Vol 5
No 1, 1987 pp 55-61

[English abstract of article by Jiang Guiqing [3068 2710 3237] of China
Aerodynamic Research and Development Center]

[Text] A method and formulas for aerodynamic coefficient and model attitude transform, elastic deflections and flow deviation angle correction in testing with a rolling angle have been developed. The simple and quick method and detailed procedure used to obtain longitudinal and lateral aerodynamic plots based on the testing data are presented. In this paper an accurate and simple method for calculating the real attitude of the model without solving non-linear equations and with which the testing can be carried out according to the preset attitudes is also presented.

9717

CSO: 4009/41

RESEARCH ON FLOW AROUND BLUFF BODIES, FLOW INDUCED VIBRATIONS

Miayang KONGQI DONGLIXUE XUEBAO [ACTA AERODYNAMICA SINICA] in Chinese Vol 5
No 1, 1987 pp 62-75

[English abstract of article by Sun Tianfeng [1327 1131 7364] of Beijing
University; and Cui Erjie [1508 1422 2638] of Beijing Institute of Aerodynamics]

[Text] The flow around bluff bodies and the related flow-induced vibrations are reviewed in this paper. The emphasis is placed on investigations of the flow around a circular cylinder and rectangular prism, and the interference between the two cylinders in various arrangements. The effects of body oscillation, incident shear and flow turbulence are discussed in detail. Some specific problems remaining to be solved are also identified.

9717

CSO: 4009/41

PROPAGATION OF ARTIFICIAL DISTURBANCES IMMERSED IN THICK TURBULENT BOUNDARY LAYER

Mianyang KONGQI DONGLIXUE XUEBAO [ACTA AERODYNAMICA SINICA] in Chinese Vol 5 No 1, 1987 pp 76-81

[English abstract of article by Ming Xiao [2494 2556] of Nanjing Aeronautical Institute; and H.U. Meier of DFVLR]

[Text] In a wind tunnel test, tripping wires or local surface roughness are often applied to fix the boundary layer transition on airfoils or wings. The propagation of such artificial disturbances immersed in a turbulent boundary layer on the wind tunnel's flat side wall is investigated at zero and adverse pressure gradients. It is found that the momentum loss resulting from the boundary layer disturbance remains in the boundary layer downstream. In a zero pressure gradient flow, this local momentum loss is almost an additive constant quantity. On the other hand, an adverse pressure gradient results in amplification of this momentum loss. The boundary layer disturbance resulting from wires in different diameters and locations can be quantified.

9717

CSO: 4009/41

EXPERIMENTAL RESEARCH ON CENTER OF PRESSURE OF SLENDER BODY WITH TWO POINTED ENDS

Mianyang KONGQI DONGLIXUE XUEBAO [ACTA AERODYNAMICA SINICA] in Chinese Vol 5
No 1, 1987 pp 82-87

[English abstract of article by Jia Qu Yao [6328 0575 5069] of Beijing Institute of Aerodynamics]

[Text] By using static stability characteristics, the center of pressure for a slender body with two pointed ends has been measured. It has been verified by low speed experiments that the slender body theory with crossflow can be used accurately to calculate the center of pressure for this kind of body.

9717

CSO: 4009/41

NEW DEFINITION OF PRESSURE-CENTER COEFFICIENT OF REENTRY CRAFT WITH ASYMMETRICAL CONFIGURATION

Mianyang KONGQI DONGLIXUE XUEBAO [ACTA AERODYNAMICA SINICA] in Chinese Vol 5
No 1, 1987 pp 93-96

[English abstract of article by Ren Yuhe [0117 3768 5440] of Beijing Institute of Aerodynamics]

[Text] A new definition of the pressure-center coefficient of a reentry craft with asymmetrical configuration without yaw is presented in this paper. It is used to calculate the pressure-center coefficients of this type of reentry craft. The results show that its pressure-center coefficient changes continuously with the attack angle, i.e., it no longer has discontinuity in the form of infinity. The original definition of the pressure-center coefficient of the reentry craft with axisymmetrical configuration is only the specific application of the new definition to the reentry craft with the axisymmetrical configuration.

9717

CSO: 4009/41

WORK IN SUPERCONDUCTORS DESCRIBED

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 17 Jan 87 p 4

[Report by Chen Zujia [7115 4371 3946]: "China Is Currently Engaged in Superconducting Materials Research"]

[Text] This paper had a notice on the first page of its 27 December 1986 issue reporting the fact that researchers at the Physics Institute of the China Academy of Sciences (CAS) had discovered a superconducting body at the highest temperature transition in the world. Recently, this reporter visited with Yang Guozhen [2799 0948 2823], Director of the CAS Physics Institute, and researchers Li Yinyuan [2621 5593 6678] and Li Lin [2621 2651], requesting them to answer relevant questions.

The two researchers, Li Yinyuan and Li Lin, are members of the Scientific Council of the CAS. Mr. Li Yinyuan is a specialist in solid-state physics and solid-state theories, while Li Lin is a specialist in superconductor research.

This reporter was interested in the new achievements of research into superconductors at the Institute of Physics, as well as in scientific circles both domestic and foreign. I had heard that specialists at the Institute of Physics had continued their work after the report, and would these gentlemen tell us something about it?

Answer: Over the last 2 weeks or so, young and middle-aged researchers at the Institute of Physics have continued to do superconductor experiments on the heterogeneous metallic oxides of barium- (strontium) lanthanum-copper-oxide, on which they have been working day and night. It can be confirmed that this is a rare superconducting material of very high transition temperature. We have obtained the clear result of a transition temperature of 48.6 K, and there have also been signs that a small number of samples could reach 70 K, but these are insufficiently stable. We are still marshalling our forces to carry out experiments that will allow this problem to reach a definite resolution.

Reporter: In which academic publication are they planning to give a detailed report on research achievements?

Answer: The data and curves we have achieved will be published in an upcoming issue of China's KEXUE TONGBAO. The American journal MODERN PHYSICS has also solicited materials from us and will report on our work.

Reporter: Will the achievements of the Institute of Physics be evaluated by specialists?

Answer: Some of the members of the Scientific Council, including Chairman of the Scientific Council Mr Hong Chaosheng [3163 2600 3932] and the institute director and deputy director, together with some academicians of the Physics Institute, have studied together the data and curves provided by the researchers. We approve of this work.

Reporter: Would you describe for us the international situation regarding research into superconductors?

Answer: "Superconductive" is an abbreviation of "physical superconductive electrical properties." By this is meant that in extremely low temperatures, the resistance of some substances is completely eliminated and then the properties of electrical conductivity are extremely strong. The temperature at which a substance changes from having resistance to not having resistance is called the transition temperature. This is represented in science using the absolute temperature of degrees Kelvin (K), the zero of which is equivalent to minus 273 degrees Centigrade. Presently, the transition can only be realized under liquid helium, which has created all kinds of difficulties for practical applications. Internationally scientists have done much work to raise the transition temperature for decades. The earliest work was by Dutch scientists, who in 1911 discovered the superconductivity transition temperature of mercury to be 4 K. In 1973, the transition temperature of Nb₃Ge was found to be 23 K. Until 1986, no superconducting materials had been found with transition temperatures higher than that.

In 1986 a foreign journal reported that the Swiss scientists Bednorz and Muller had discovered the transition temperature of lanthanum-barium-copper-oxygen heterogeneous metal oxides to be as high as 30 K. Their paper was written in great detail, but was insufficiently confirmed. Later, it was also reported that the transition temperature of strontium-lanthanum-copper-oxygen series materials could reach 37.5 K. At the end of 1986, it was reported in American newspapers that Professor Zhu Jingwu [C. W. Chu] [2612 4842 2976] of the University of Houston discovered the transition temperature of the barium-lanthanum-copper-oxygen series to be as high as 40.2 K. In summary, many scientists throughout the world are working to raise the transition temperature of superconductivity.

Reporter: Would you please discuss the significance of this research?

Answer: We have just explained what superconductivity means. If a substance were to be superconductive, the consumption of electrical energy would be reduced, and this would have an undoubted effect on growth of the national

economy. For example, using superconductors for making electromechanical devices, electronic instruments, computers, etc., would result in a great savings in energy, and the physical size of products would also be greatly reduced. Someone once made a superconducting computer elsewhere in the world, but because the transition temperature was too low and the computer had to be immersed in liquid helium, this computer was extremely impractical and had no practical value. Therefore, scientists want to find some materials with high transition temperatures, which is the only way there can be a value for industrial applications. Speaking at this moment, the dissemination and application of superconductors is still rather distant.

In addition, by achieving superconductivity we could generate very strong magnetic fields, which would be very useful in science. For example, in our studies of nuclear fusion, the generation of very powerful energy requires strong magnetic fields. These could be realized through use of superconductors. Use of superconductors could be used to make quantum interference devices and other highly sensitive detection devices. Research on realizing superconducting mechanisms is also of value to science.

12586

CSO: 4008/2053

RUAN CHONGWU ON S&T RESEARCH FUND REFORM

OW292028 Beijing XINHUA in English 1445 GMT 29 Apr 87

[Text] Beijing, 29 April (XINHUA)--The reform of research funds allocation was successful last year, Ruan Chongwu, vice-minister of the State Science and Technology Commission, said here today.

Speaking to officials of the ministries and commissions concerned at a meeting here today, the newly-appointed vice-minister said that the research units of the country's 55 ministries and commissions, excluding the Chinese Academy of Sciences, netted 450 million yuan in profit in 1986 through serving the economy and the society. That amount was 29.8 percent of the annual government financial allocation and a 15.1 percent increase over 1985. Of the 450 million yuan, 65.3 percent of income was from technical sectors.

Ruan cited other statistics: the development research units under the 55 ministries and commissions gained 340 million yuan in income in 1986, 111 percent of that year's financial allocation. That was an 11.5 percent increase over the previous year, and of the 340 million yuan, 61.3 percent was from the technical sector.

Before the reform, the government alone allocated funds to the research units.

Ruan noted that under the old system the research units got their tasks from the higher authorities. The quality of their work was not checked and tested by the economy or society, leading to discrepancies between research and economic needs.

Secondly, the state's limited funds could not satisfy all the research needs thus, some tasks which could otherwise have been fulfilled in a year or two were stretched to three or five years or even longer.

On the allocation reform's next step, Ruan said that one important task is to create better conditions for the development-oriented research units to become more closely linked with the economy and the society, and gradually reduce the fund allocation.

/12913

CSO: 4010/44

S&T POLICIES CREATE FINANCIAL DIFFICULTIES FOR INSTITUTES

Beijing KEJI RIBAO in Chinese 10 Jan 87 p 1

[Report by Chen Dong [7115 2639]: "Science and Technology System Restructuring Policies Are in Urgent Need of Supplementation"]

[Text] Not long ago, this reporter visited Guangdong Province, and many local science research institutes made it clear that because of the incomplete nature of the policies regarding the restructuring of the science and technology system and the fact that operating expenses have been reduced, reforms in the areas of finance, banking, taxation, and cadre management have not kept pace. This has led to certain difficulties for the growth of research institutes, consequently affecting the continued progress of the reforms.

Expenses in all areas have made it difficult for the institutes to make ends meet. According to statistics from the Guangdong Province Science and Technology Commission, the per capita operating expenses for 33 technology development institutes affiliated with the province are only 2,500 yuan (no change after fixing in 1980), while annual current average wages and supplements require 1,800-2,000 yuan, or about 75 percent of all operating expenses. Other things, such as group welfare funds (including expenses for discharged and retired personnel activities) are about 12 percent, utilities fees (including office electrical fees, power fees for outside lines, and higher priced fees for power that is over quota) are about 9 percent, vehicle expenditures (including increased road maintenance fees, bridge fees, insurance fees, and higher above-quota fuel prices) are about 7 percent, official business expenses are 3 percent, and things like social apportionments make up 2 percent.

There are numerous items of taxation, deductions, and apportionment regarding income for science research institutions. For funds they lack, institutes must depend upon the income they generate to make up the differences. However, as soon as there is income, the various taxes, deductions, and apportionments appear one after the other: in addition to the amounts determined by the state to be paid over for energy and transportation (about 15 percent of net income), the commodity operations taxes, added value taxes, and income taxes are about 55 percent of income from manufactured products. Self-raised funds building taxes, municipal government and construction taxes,

and city planning taxes, etc., constitute about 15 percent of funds in circulation, deductions for responsible departments are about 15 percent of income, deductions for finance departments are about 2 percent of income, and then there are various apportionments and assistance, which total more than 20 other expenses. For example, in 1983 the provincial office of agricultural machinery levied 8 various expenses and increased these to 14 in 1985, so that the funds handed in for taxes were increased from 75,846 yuan to 197,165 yuan.

Currently, the equipment at a majority of institutes in Guangdong Province is obsolete and research methods are behind the times. When this reporter went for interviews to the Office of Light Industry, I saw that many rooms in a newly constructed 4,500 sq m laboratory building were empty, having literally nothing at all. Existing instrumentation and equipment is also extremely simple and outmoded. According to a survey, the total value of equipment at 64 research institutes affiliated with the province is only 67.337 million yuan, where on the average each institute has only 1.052 million worth, which is even worse off than conditions at public enterprises at the middle level in this province. In addition, there are no funds for exclusive use in renewing instrumentation and equipment.

This lack of means for intermediate testing and conditions is an important reason why the achievements from science research cannot be quickly transformed into production forces. Reason would have it that as soon as science research achievements have been successful in intermediate testing, the rights to them should immediately be transferred to enterprises. However, for one thing, enterprises still lack enthusiasm for absorbing new technologies, and another thing is that "technology is not worth money." The achievements for which institutes have paid hundreds of thousands of yuan will invariably be priced at less than 100,000 yuan and still will not sell. About 60 percent of self-generated income for institutes at present must rely upon intermediate testing for products, but since intermediate testing is backward, this has led to the costs for products being clearly higher than those of enterprises. Because the state lacks taxation methods that can serve to guide the science research system, the tax departments in all areas basically treat institutes and enterprises in the same manner, but in the area of bonuses, what is in effect are bonus policies for government workers. According to a survey of the provincial tax bureau, annual per capita bonuses in 1985 for the provincial Office of Machinery and Office of Agricultural Machinery (both experimental units for restructuring) were much less than for the corresponding Academy of Design and enterprises. Currently, in order for many institutes to "get by on a shoestring," they have ransacked old boxes and chests to come up with what they can, but if things go on like this, what will they do in 3 or 4 years, and where will their reserves be?

12586

CSO: 4008/2054

LEADER URGES ADOPTION OF 'DUAL UNLEASHING' S&T POLICY

Beijing KEJI RIBAO in Chinese 6 Jan 87 p 1

[Report by Han Yuqi [7281 3768 3825]: "Getting Rid of Six Old Concepts and Establishing Six New Concepts, and Promoting the Restructuring of the Urban Science and Technology System By Means of the 'Dual Unleashing'"]

[Text] Zeng Xianlin [2582 2009 2651], deputy chair of the State Science and Technology Commission, pointed out at the All-China Conference on Restructuring Some Urban Science and Technology Systems that convened today that the thinking behind the restructuring of the science and technology system in this country for 1987 is already clear, and we will use the "dual unleashing" (i.e., unleash science research organizations and unleash scientists and technicians) to promote the restructuring of science and technology systems in the cities.

Zeng Xianlin said that to implement the basic principle of "dual unleashing" for science research organizations, on the one hand, government departments will transfer science research organizations to a lower level, there will be a separation of the responsibilities for governing and research, respectively, and through lateral relations there will be a gradual implementation of the unification of scientific research and production through varied forms; second, for research units with poor operations and deficient results, a system of leasing and contracts will be employed. Large research institutes could be changed into small ones, then leased and contracted. A particular laboratory or research group at an institute could also be contracted. Each person could be contracted, or this could be by groups; third, the focus of system restructuring will be placed on the 1,005 research organizations affiliated with the central authorities, including all departments of the State Council and of the Chinese Academy of Sciences. The invigoration of these research organizations is the key to success of the restructuring of the science and technology system; fourth, we will hasten the pace at which allocation of operating expenses is reduced. Some people have called this "weaning," and continuing the aim of "weaning" is to bring about the self-reliance of the institutes.

Zeng Xianlin pointed out that to engage in this "dual unleashing" we must renew our concepts. To this end, he proposed the elimination of six old concepts and the establishment of six new ones.

We should eliminate protectionism and establish a concept of competition under conditions of equality. Protectionism comes primarily from departmental ownership and the way to resolve this is to "cut off the milk" and look for food. Institutes must establish the concept of operational autonomy, of economic self-reliance, and of responsibility for profits and losses.

We should eliminate the hierarchical concept in science research organizations and establish the concept of a commodity economy, one that seeks real profits. When part of scientific and technical circles, this old concept of "such and such a level" is of no use to the development of our causes. Those empty levels of hierarchy are not worth pursuing, and we should pay attention to real profits, where as long as the means are correct, we should be bold in emphasizing profit, in gaining profits, and in seeking profit.

We should eliminate the feudal concept of literati and officialdom among scientists and technicians, and should establish concepts that combine with the actual practice of production and that cater to economic construction. The literati and officialdom thinking that prefers name to profit, having money to earning it, and printed words to commerce is a pedantic concept, and should have long been eliminated. Scientists and technicians should be encouraged to leave the institutes to join with production for the creation of enterprise and the achievement of wealth.

We should eliminate the concept of begging the state for money, and replace it with the idea of relying for prosperity upon the earning of money by science and technology; we should eliminate the concept of institutes "eating from the common rice bowl," replacing it with the idea of scientific and technical contracting and the leasing of factories and institutes for prosperity.

We should eliminate the ideas of egalitarianism and "eating from the common pot" in regard to allocations and establish the idea of more gained for more effort, which will allow scientists and technicians who make the greater contributions to become richer first.

We should eliminate the normal methods of tasking by the state, state planning, and equal treatment, replacing these with the idea of the marketplace. We should seize upon technical information and commodity information as the markets change in our pursuit of technical achievements.

Zeng Xianlin proposed that the "dual unleashing" will be certain to advance the restructuring of the cities, and that the "dual unleashing" is certain to result in the appearance of many scientific and technical individuals and scientific and technical groups. He said that scientific and technical individuals will be the explorers to emerge from the old science and technology system and the old models, and that there should be full recognition of scientific and technical individuals. The emergence of scientific and technical individuals will burst the locks on traditional concepts, and scientific and technical individuals will become the new entrepreneurs who will set up a new structure, who will establish new systems, and who will found some new mechanisms for science research and production operations. Scientific and technical individuals will act as the fermenting

agent by which science and technology will cater to the economy and by which it will cater to integration with production. They will become the "neutron-current" in contact with the capacities and potential of the institutes. In summary, the principle of "dual unleashing" will fully promote the deepening expansion of the restructuring of the science and technology system.

Eliminate protectionism, and establish the concept of equal competition.

Eliminate the concept of levels, and establish the idea of a commodity economy.

Eliminate the concept of egalitarianism, and establish the idea of getting more for more effort.

Do not favor name over profit, but cater to economic construction.

Do not beg for money, but rely instead on scientific and technical self-reliance.

Do not put equal amounts of rice into the plate, but rather establish a concept of the marketplace.

12586

CSO: 4008/2053

LIAONING AGRICULTURAL PROJECT MODEL SPARK PLAN

Beijing LIAOWANG OVERSEAS EDITION in Chinese No 3, 19 Jan 87 pp 12-13

[Article by Jiang Min [1203 2402]: "The '1,2,3 Project' that Was Earliest to Ignite China's Spark Plans for Science and Technology"]

[Text] The first "science and technology spark plan" ignited on the Chinese mainland was the "1,2,3 Project" in Liaoning Province. So what is the "1,2,3 Project?"

In 1983, the Liaoning provincial people's government designated the three counties of Fuxin, Kazuo, and Haicheng as base counties for comprehensive scientific testing in modern agriculture. In early 1985, another 20 starting point townships and 100 demonstration villages were selected throughout the province. These 100 villages, 20 townships, and 3 counties were a 3-level comprehensive scientific testing and demonstration base that formed a systems engineering entity. This is what people mean by the "1,2,3 project." From here, the "science and technology" spark plans in Liaoning were ignited.

The "1,2,3 Project" and the "Spark Plan"

Well then, what is the relation between the "1,2,3 Project" and the "spark plans" now being implemented throughout China? The "1,2,3 Project" was where counties, townships, and villages under different natural, economic, and social conditions used the principles of systems engineering and in line with local conditions comprehensively used the appropriate technologies from relevant disciplines within a particular base, and made the most of the overall efficiency of science and technology to create the largest economic and social results. So the "spark plans" are where throughout the country a number of "short, even, quick" projects are selected that are intended to have significance for demonstration and dissemination for town and township enterprises. That is, they are technology development projects where the time for scientific and technical commercialization is short and where economic results are gained quickly, and that implant new embryos in small to medium enterprises and in town and township enterprises, allowing new technologies to ignite like kindling everywhere. Therefore, the two subjects are related, but they have their differences. The "1,2,3 Project" was implemented before issuance of the "Resolution by the Central Committee Regarding Restructuring of the Science and Technology System," and it was undoubtedly an inspiration

for the state in formulating and implementing the "spark plans." Recently, when State Council member and State Science and Technology Commission chairman Song Jian came to Liaoning for observation, he highly evaluated the "1,2,3 Project." He said that the "1,2,3 Project" of Liaoning is a creative miniature of the state "spark plans."

The first period for implementation of the "1,2,3 Project" was set at 3 years, i.e., from 1985 through 1987. The general requirements are: that the portion of growth in gross output value for industry and agriculture for the counties, townships, and villages of this project that is due to advances in science and technology be 50 percent or more; that the gross output value for industrial by-product industries (including the third industry) be 80 percent and more of the gross industrial and agricultural output value; and that 60 percent and more of the labor be involved in industrial by-product production. In accordance with the principles of overall planning and overall development for agriculture, forestry, and animal husbandry, for agricultural industrial commerce, and for science popularization, the county and township levels have established comprehensive science experimentation and demonstration bases. The majority of base point villages focus on specialized product manufacture through planting crops, breeding, or processing industries or operations involving certain special products, thereby forming scientific and technical demonstration villages with particular characteristics. By 1985, the gross output value as generated by the "1,2,3 Project" has been estimated to possibly reach from 2 to 2.5 billion yuan, with even greater social results.

Establishing Modern Agricultural Ecological Models

Whether one is talking about impoverished areas or the wealthy towns and villages, in modern Liaoning all are setting up modern comprehensive agricultural ecological models to meet the demands of agricultural modernization, and these will allow the impoverished areas to change within a short time and the wealthy towns will add to their glory.

Fuxin County, situated in the wind-blown semi-arid region of northwest Liaoning is an autonomous county that has the largest area in Liaoning Province, that has numerous natural disasters, the economic base for which is weak, and where Mongols live in communities. After implementation of the modern comprehensive scientific experimental sites, this county first surveyed its natural resources, clarified the natural resources of land, irrigation, weather, organisms, and mineral resources, as well as the economic and technological conditions, and proposed the principle that "forests and grasslands were to be first, and the focus is to be on grazing, with comprehensive development of agriculture, industry, and commerce." The existing 4.29 million mu of cultivated land was reduced to 2.8 million, and the retired cultivated area was replanted with grass and trees. Forested land went from the 2.68 million mu of the past to 3.75 million, grasslands grew from the former 1.77 million to 2.20 million, and the proportions of agricultural to forested to grazing lands was adjusted from the former 1:0.56:0.4 to 1:1.34:0.8. Consequently, this has changed the situation of the vicious cycle where broad cultivation brought in poor harvests, replacing it with benign ecological conditions. At the same time, in accordance with natural divisions they established science research bases in eastern, western,

southern, northern, and central areas, and at the village of Hailibao in Jiumiaozi Township they set up a base site for wind-blown forested, grazing, and oil areas. They initiated research work on "integrating agriculture and grazing on grasslands" and on "developing grazing grasses and green manures to improve soil fertility" to promote the northern conservation area. Presently, the total area in the northern area under cultivation for grazing grasses and green manure is already 25 percent of the total cultivated land; at the village of Shazhalan in Taben Township in the central area, they set up a vegetable oil crop base site, primarily for the mechanization of comprehensive technologies for higher yields and of technologies for higher yields in semi-arid region agriculture, as well as for research in establishing commodity production bases. Over more than 2 years, the areas of dissemination of mechanized comprehensive higher production technologies throughout the province have reached 2 million mu; in addition, the Yanggaotun Village in Rongzhen Township in the southern part has established a base site for lowlands oil fruit. They have developed research into comprehensive increased yield technologies for oil crops; in the western part they have established a multiple operations area base site for the cultivation of oil in the Qiuling Forest, and at the Shijiazhi Township in the eastern part they have set up a grain and sugar economic crop area base site, which primarily studies high-yield cultivation technologies for foodstuffs and economic crops. In addition to this, they have set up specialized research sites in four villages and one demonstration farm to hasten the modernization of agriculture throughout the province. Last year, yields were good from all the industries of agriculture, forestry, and grazing in this province, and gross yields for grains and beans reached 650 million jin, for a per capita average income of 330 yuan. This is an increase of more than three times that before the experimental sites.

Xiahetao Village in the Laoyemiao Township of the Harqin Zuoyi Monggol Autonomous County established a scientific experimental base site with a primary research topic of a high yield agricultural field ecological system, which constitutes a comprehensive ecological agricultural model for high and stable yields.

This model focuses on the production of economic crops such as cotton, peanuts, sesame, and tobacco and on domestic poultry and fruit, with the intention of attaining self-sufficiency in foodstuffs. This model includes six large sub-system projects, namely, the establishment of a man-made forest system having hillside erosion control forests, fuel forests, hillside orchards, green manure forests, and forests for floodlands; a high yield agricultural system that integrates agriculture, forestry, and grazing with the preliminary processing of agricultural products; and an animal raising system that focuses on small poultry raising and beef operations, etc. In addition, on the basis of the principles and methods of systems engineering, they seek to optimize all technologies in installations to become ecological agricultural model villages having higher ecological and economic results. For three years now, the agricultural field ecology environment at this village has improved greatly, and economic results have had a remarkable improvement. In 1982, average income in this village was only 36 yuan, but in 1985 reached 350 yuan, nearly a tenfold increase in 3 years.

Results that Are Preliminarily Apparent

The "1,2,3 Project" has opened broad avenues for the integration of urban scientists and technicians with the countryside. According to statistics from the last 2 years, 527 scientists and technicians have participated in the development of the "Project," and through the means of transfer of rights and of joining with others, they have transferred hundreds of new achievements, new technologies, and new products to the towns and villages.

The Liaoning Province Academy of Agricultural Sciences has sent more than 40 middle and high-level scientists and technicians to the Fuxin base county for year-long grass-roots experiences. Over the past few years, they have taken on the responsibilities for 12 state and province commissioned science research projects, and currently 6 of those research achievements have been evaluated by the state and the province as major achievements in science and technology. One among them, research into cultivation technologies for wind-blown arid regions, has accumulated some 100,000 items of data, and has accordingly proposed six measures for restructured cultivation techniques in windy arid regions. On this basis, the State Ministry of Agriculture, Animal Husbandry, and Fishery held a conference at which it was decided to broadly disseminate this over similar areas of the three northeastern provinces and Nei Mongol.

Researchers at the Forestry and Pedology Institute of the Chinese Academy of Sciences have brought together nearly 100 scientists and technicians from more than 10 higher institutions and research units, who were formed into 13 specialty groups involved with agriculture, soils, forestry, fruit and silk, herding, irrigation, geology, and farmland ecology. They undertook a full scale comprehensive examination of the natural conditions, natural resources, and social and economic situations throughout the province, from which they found five beneficial conditions and six unfavorable factors for developing production, and from which they formulated a program for implementation in the basic county. In accordance with the scientific basis and demands of the implementation program as provided by the comprehensive observations of the research personnel, in aspects of cultivation, this county has extended the areas for cotton and oil crops; in the area of animal husbandry, they have focussed on developing a livestock industry centered on cattle; for orchards, at the same time as the transformation from low yields to high yields, they have actively developed fruit product production centered on apples and hawthorn; and they have constituted a production system for building materials products and a processing system for agricultural by-products, which allows for great changes in the aspect of this county. To investigate the avenues for agricultural modernization in the suburbs, the Institute of Agricultural Sciences at Fanyang City has sent more than 10 scientists and technicians for grass-roots level study in Tiejiangtun Village in the Dongling District of Fanyang City, where they have established an agricultural demonstration base for scientific and technical achievements. Using new technologies and new achievements, this village has been able to raise the amount of land for cultivating superior varieties of vegetables from the former 25 percent to 85 percent, and the area covered by plastic film grew from more than 300 mu to more than 1,000 mu. In addition, they disseminated soil test and fertilizer application techniques, as well as new agricultural chemicals and growth

hormones, which have promoted great increases in yields for vegetables. Last year, gross output for vegetables throughout the village reached 16.34 million jin, a growth of 24.2 percent over the period before the test sites. Gross output value rose by one and one-half, and average per person income went from the 309 yuan before the test sites to 981 yuan, all of which has served an exemplary function in building the vegetable base sites.

12586

CSO: 4008/2054

TECHNOLOGY MARKETS' PROGRESS REPORTED

Beijing LIAOWANG OVERSEAS EDITION in Chinese No 3, 19 Jan 87 pp 15-16

[Article by Yang Jisheng [2799 4949 4939]: "China's Technology Markets Are Beginning to Take Shape"]

[Text] Technology markets sprang up 5 years ago in China. After 5 years of growth, it may now be said that they are beginning to take shape. There are more than 1,000 technology trade organizations throughout the country, and another more than 200 technology trade organizations carrying out the import and export of technology outside of China. In 1985, the domestic technology markets had actual technology transaction volumes of more than 2.3 billion yuan. In technology trade outside of China, total volume of technical imports was \$2.96 billion. China's export of technology has just begun, but transactions have been quite impressive. The two-step fermentation technology for vitamin C alone has been sold for \$5.5 million.

After China implemented restructuring of the economic system, market competition began between enterprises, and the technology markets arose in response to that. In 1980, compensated transfer of the rights to technologies was put into effect in China, and intermediary service organizations that promoted the compensated transfer of rights to technologies and acted as "go-betweens" between science research and production appeared in large cities such as Fanyang, Wuhan, and Tianjin. These were the seeds of the Chinese technology markets. After that germinal period (1980-1981) and the period of initial formation (1982-1984), and until March 1985, after issuance of the "Resolution by the Central Committee Regarding Restructuring of the Science and Technology System," the technology markets grew abruptly and began to take shape.

Currently, the Chinese technology markets are continuing to grow steadily, and have manifested some quite startling characteristics:

First of all, they have preliminarily constituted a network for technical commodities circulation that has various economic components, is hierarchical, and has multiple channels. The 29 provinces, municipalities, and autonomous regions throughout the country, as well as many prefectures and counties, have all set up organizations for dealing with technical commodities. There are those that are state-run and those run by groups, and there are also those that are jointly run by individuals. They have spread out from the coast to the interior, and from economically and culturally developed areas to all

areas of the country, and national or regional technology development and trade organizations continue to appear. Not only science research units and production enterprises join in the technology trade activities, but financial organizations also actively blend funds into the technology trade, and technology risk investment companies have begun to appear.

Second, the matters concerned with technology trade are becoming more and more abundant. The technical commodities in circulation in the technology markets are more and more numerous, and they have grown from overstocked technology achievements to technical achievements that have been newly developed or await development, and they have gone from the transfer of rights to single technology commodities to the transfer of rights to entire sets of technologies; and they have grown from the transfer of rights to general technologies and technical services to technology contracting and technology shareholding. It is especially worth noting that more than 10,000 research and production associations of various types have been formed from the lateral associations aimed at technology development and technology dissemination. Among these there have come into being some rising new industrial groups that transcend regions and transcend sectors.

Third, the formats for technology trade are more and more flexible, and in the course of trade, people have created forms of trade that are quite varied. For example, there are permanent, fixed technical trade offices, mobile technology trade centers, communications technology markets, broadcasting technology markets, technology trade fairs, and public bidding on difficult topics. Among the technology trade fairs, there are the comprehensive and also the specialized; and there are the large scale as well as the small and mid-sized. There are also very flexible ways to pay the purchase prices, dozens of ways among the three major forms of paying it all at once, in installments, or with a fixed amount plus installments.

Fourth, they have better implemented the integration of planning with the marketplace. Many technology items in planning elicit competition from many firms in technology bidding, the most favorable among which signs a contract for the transfer of technology or commissioned research. Currently, items in planning for capital construction, technology transformation, and technology problem solving have entered the technology markets in large numbers, and some major state technology development items are also for public bidding in the technology markets. For example, among contracts signed at the first national technology trade fair held last year, 22 were for amounts of 10 million yuan and more, and 134 were for contracts totaling 1 million yuan and more.

Fifth, there is interaction between the international technology markets and domestic technology markets, each supplementing the other. Some technologies originally planned to be imported from abroad, were first bid out at domestic technology markets, which tapped and made the most of the potential in domestic technology; the power of the domestic technology markets has been used to absorb and assimilate imported technologies, hastening the pace of nationalization; importation has been done on the basis of domestic research and development, and research and development has gone on from the point of that importation; from the importation of single technologies, activities have grown to the point where technologies are both imported and exported. These

things have all facilitated the model toward which the domestic technology markets are currently developing-- "technology is imported--there is research and development--products and technologies are exported."

Sixth, organization and management of the technology markets is progressively strengthening. In April of last year the National Technology Markets Coordination and Guidance Group was established, and already nearly 20 provinces and central cities have also established coordination and guidance organizations of this type. Efforts at coordination, management, and survey statistics are currently being enhanced. Several policies regarding technology trade have been formulated, and some complete technology market management laws are currently being established.

Although there have only been a few years since their inception, the technology markets in China have already shown an exuberant vitality, and have brought about clear social results.

The technology markets have erected a broad bridge between science research and production. That research and production have been separated is due to problems that have existed in China for many years. However, in the technology markets research units and factories and enterprises have come into direct contact, which has altered the situation of the past where "though they could both hear the sound of a cock crowing, never in their lives had they met" that existed because of sectoral disjointedness. Marketplace competition has given research units an external power with which to cater to the economy, and the economic benefits have then given those research units the internal motivation with which to cater to the economy. Through the technology markets they can understand the needs of production for technology, and they can aim at these needs in their research and development. The various formats for public bidding on difficult topics for production units, commissioned research, and joint development have also directed science research toward the needs of economic growth. Shared economic benefits allow science and technology to cater to production, and allow production to rely upon science and technology. According to statistics from some large cities, the rate of application of research achievements has gone from the 20-30 percent of 1980 to the 50-65 percent of 1985.

The technology markets have promoted the overall restructuring of the science and technology system. The appearance of the technology markets has brought a series of chain reactions to the restructuring of the science and technology system, and have become windows on the restructuring of that system. By 1985, there were 1,499 independent research and development organizations implementing the technology contract system, which was 31.9 percent of the total number of independent research and development organizations. Among those, 317 organizations had achieved economic self-reliance. This has not only allowed technology development organizations to have a certain degree of autonomy with which to develop their capabilities, but this has also freed up a certain amount of money, creating the conditions under which to implement natural science funds and an allocation system for major projects. The technology markets have also stimulated internal restructuring within the research and development units. The Tianjin Institute of Chemical Engineering of the Ministry of Chemical Industries has implemented several economic

responsibility systems, such as topic contracting, technical service contracting, and achievement marketing contracting, and has formulated 17 rules and regulations. Net income in 1985 was 1.94 million yuan, twice that of 1984. The technology markets have not only promoted the circulation of technical commodities, but have advanced the rational movement of skilled personnel. Advertising for skilled workers is a cause that has most caught people's attention in the technology markets. On behalf of customers, the Fanyang City technology market has used the means of advertising for technical guidance, technical advisers, and temporary engineers to transfer more than 90,000 scientists and technicians, and has helped small to medium enterprises solve a number of technical difficulties unresolved for a long time. Because the technology markets have acknowledged the value of technology, the value of skilled personnel is increasing along with it, which has found an effective solution for the long standing difficulty in China in which the role of scientists and technicians has not been fully realized.

The technology markets have enhanced the capacity of society for technology development, and have supported small to medium enterprises and the town and township enterprises. Thousands of scientists and technicians have left the front lines of production, research units and production units have jointly promoted technological advances, the state, groups, and individuals have joined to develop technology, to deal with technical commodities . . . From all aspects, these things have strengthened the vitality of technology development and of the dissemination and application of technology. The small to medium enterprises, and especially the town and township enterprises, have been most favored. In the technology markets they have found new products they need to develop themselves, have gained new techniques with which to improve product qualities, and have employed technical personnel. A number of small plants in difficult straits have gone from ruin to new lives, and a number of small plants that always had good facilities have become even more prosperous. The science and technology commission of Xiaoshan County in Zhejiang Province did a survey of 526 town and township enterprises in which they found that 403 factories had established joint operations with higher institutions, research units, and larger enterprises. They brought in a large quantity of technical achievements and more than 2,000 specialists or moonlighting technical personnel, from which economic results for the enterprises have greatly increased.

The technology markets are a new organism to appear in China in the 1980's. They are just like any new organism, where there is likely to be a deficiency here or there. For example, the policies and laws for technology market management are still incomplete and not coordinated, there are still many loopholes, and the laws are not uniform; management is weak and guidance not strong for many of the larger technology operations organizations; there have been some unhealthy tendencies that have appeared in the technology markets, even certain fraudulent activities, but as long as we continue to maintain the principle of "opening up, invigorating, fostering, and guidance" for these problems, as the technology markets continue to grow, these problems will gradually be resolved.

12586

CSO: 4008/2054

BOEING DEMONSTRATES HELICOPTERS FOR CAAC

OW211418 Beijing XINHUA in English 1338 GMT 21 Apr 87

[Text] Beijing, 21 April (XINHUA)--The Boeing Vertol Company will begin to conduct China's first commercial helicopter demonstration on 22 April.

Jerry Van Sickel, director of Boeing Vertol's Asia-Pacific Sales, made the announcement at a news conference here today.

"The 30-day demonstration tour is being made on the invitation of the Civil Aviation Administration of China (CAAC)," he said, "and a team will put the helicopters through their paces for government and military officials."

According to Van Sickel, the Boeing 234 commercial Chinook team will start demonstrations of the helicopter's passenger transport capability, and heavy-lift and rescue-hoist operations in Beijing from 22 to 27 April. The team will then fly to Shanghai, and Zhejiang and Anhui provinces to continue demonstrations, which will include assembling electrical transmission towers and stringing conductor lines 2,300 meters across the Yangtze River. Finally, the team will fly to Guangzhou on 13 May where it will conclude its demonstrations.

"Boeing Vertol's President Joseph Mallen and Vice-President William P. Jones will participate in demonstrations," Van Sickel said, adding the company is a division of the Boeing Company based in the United States.

"To date, Boeing has sold 44 aircraft to CAAC," Van Sickel said, "and we hope the helicopter demonstrations will further economic and technological cooperation between Boeing and the CAAC."

/12913
CSO: 4010/44

NATIONAL DEVELOPMENTS

POST, TELECOMMUNICATIONS SERVICE IMPROVING

OW300943 Beijing XINHUA in English 0715 GMT 30 Apr 87

[Text] Beijing, 30 April (XINHUA)--Computer-controlled switchboards, optic fibers and satellite communication have improved China's post and telecommunications services.

According to Lou Hairi, president of China's Post and Telecommunications Research Institute, while improving existing facilities, his institute is focusing on information system research to incorporate more computers into the country's telecommunications facilities.

Over the last decade, Lou said, at a ceremony marking the 30th anniversary of the institute's founding, the institute has completed 308 scientific and technological research projects up to international standards of the early 1980's, of which 90 percent have been installed nationwide.

Commenting on telecommunications equipment research, the president said, the institute does mostly comprehensive studies, including those involving computer- and numerical-control.

The institute's project of developing a computer-controlled long-distance switchboard featuring 1,024 lines shows China has mastered the necessary technology to produce computer-controlled switchboards up to international standards of the 1980's.

The institute is also working on software research, Lou said, adding that eight communication network systems and 52 state standards have been developed since 1979.

The institute is also encouraging more academic exchanges with foreign counterparts, Lou said.

/12913
CSO: 4010/44

POST, TELECOMMUNICATIONS RESEARCH UPDATED

OW011203 Beijing XINHUA Domestic Service in Chinese 0542 GMT 30 Apr 87

[By reporter Yang Like]

[Text] Beijing, 30 April (XINHUA)--The Post and Telecommunications Research Institute has been embarking on scientific research, keeping in mind the actual needs of the country. Of the 119 research projects accomplished in 1986, 96 percent have been put into use, meeting urgent needs in the telecommunications field.

Prior to the introduction of satellite communications to the country, comrades of the institute's Nos 1 and 4 research centers installed in Xizang, Xinjiang, and Nei Monggol 25 sets of televised program receivers they had developed over a period of three months or so, providing people in remote mountainous areas with the conditions they need to receive television programs. Then, over a period of two months or so, the No 4 Research Center successfully developed a satellite communications earth station with a 4 meter-diameter antenna. The first satellite communications earth station, with a 6 meter-diameter antenna, developed by the No 1 Research Center has been in use in Tongliao City, Liaoning, since it was tested and approved by the International Satellite Telecommunications Organization [INTELSAT], pushing China's satellite communications technology a big step forward.

The birth of the 2,000-line computer-controlled switchboard shows that China has mastered the technology of international standards of the early 1980's--a technology of far-reaching significance for upgrading the outmoded status of China's telecommunications technology. A long-distance interregional automatic dialing service has become possible with the appearance of a 72-circuit computer-controlled automatic switchboard, with a calibrated terminal. After this equipment was installed in eight prefectures in Hebei, the province became the first with a long-distance automatic dialing service. The successful development of the 4,096-line computer-controlled switchboard for household telegrams and slow data exchange has solved the urgent needs of large and medium-sized cities in China, and laid the foundation for a low and medium speed data exchange network. Three months after a sample switchboard was installed in Dalian, the total investment was recouped.

/12913

CSO: 4008/51

NATIONAL DEVELOPMENTS

SATELLITE LAUNCH CENTER AIDS LOCAL ECONOMY

Beijing KEJI RIBAO in Chinese 25 Jan 87 p 2

[Report by Ma Yinchang [7456 6892 2490] and Li Yong [2621 0516]: "Xichang Satellite Launch Center Supports Panxi Reconstruction"]

[Text] As the new year begins, the Xichang satellite launch center has continued to receive the heartfelt gratitude sent from some factories and mines in Panxi Prefecture and from pertinent party and government organizations. This appreciation has highly praised the fact that they provided technical services, as well as the contributions made in support of the building of the "two cultures" in that area.

On 1 February 1986 Premier Zhao Ziyang said upon inspecting this base area that "You should make the most of your technical advantages to make more contributions to the development of the Panxi Prefecture." Over a year, the party committee of the launch center took the spirit of this statement as a guide for behavior in raising consciousness and in adapting to strategic changes, and at the same time as they were completing various major science research training tasks, they sent out the most outstanding technicians. In keeping with the principle of taking the initiative in sending technology right to various doorsteps, they have actively supported economic construction in that area. To date, they have sent out more than 200 high-level technicians to do equipment renewal transformations for 41 medium to large enterprises and to hold 12 sessions of various technical training classes and technical consulting. They have generated more than 770,000 yuan in economic results.

Equipment at a cement plant in Dukou City was rather obsolete, the quality of the cement produced was extremely variable, and they could never satisfy the needs of the marketplace. After learning of this situation, the launch center quickly sent out high-level engineers to this plant for a technology survey, and after numerous scientific demonstrations, they made suggestions to this plant regarding automated control of a rotating kiln, which were quickly accepted. Following that, they also sent people on special trips to large cement plants in various places in Wuhan, Anhui, and Yunnan for observations, organized manpower into technical problem solving, and quickly came up with a design program, consequently resolving technical difficulties for these plants that had long remained unsolved. Each year, a branch of the Wuchang Railroad

has a batch of instruments and meters that it wants to send away for overhaul and calibration, which both affects railroad shipments and also leads to waste. The Office of Measurement at the launch center took the initiative in calling on the station and taking responsibility for overhauling and calibrating all the instruments and meters at the railway office.

At the same time as they have been supporting economic construction in the local area, they have also made great contributions to the building of spiritual culture. Panxi Prefecture, located among cool mountains of varying sizes, has poor television reception. After establishing relations with pertinent units, the launch center sent out people on several occasions. Climbing mountains and fording streams, they surveyed locations in the remote areas, finally installing three satellite ground-reception stations in a national minority community. They also installed closed-circuit television for 21 enterprises and institutions and for education departments. In addition, they have also paid attention to making the most of the abundant technological strengths there and the advantages of advanced equipment, and have taken the initiative in assuming educational and technical training tasks for schools and for factories and mines. They have also opened some laboratories that have long been inaccessible to higher institutions to provide for them arenas for education and practice.

12586

CSO: 4008/2064

NATIONAL DEVELOPMENTS

MARINE MONITORING FORECASTING NETWORK TAKES SHAPE

HK090505 Beijing RENMIN RIBAO (OVERSEAS EDITION) in Chinese 6 Apr 87 p 1

[Report by Wang Yongfu (3769 0737 6346): "China's Three-dimensional Ocean Monitoring Network has Preliminarily Taken Shape"]

[Text] China is actively promoting marine monitoring and marine environment forecasting with a view to implementing its great strategy in marine exploitation. According to the State Oceanography Bureau, China has now preliminarily set up a three-dimensional marine monitoring network that covers the country's coastal waters and deep sea areas, as well as the surface and airspace. The marine environment forecasting service, which is to safeguard maritime security, is being steadily upgraded, new service items have been added, and good economic results have been scored.

Marine exploitation is an undertaking of great potential for China, which has a vast maritime area. Also, China is frequently confronted with ocean-related natural disasters. About one-third of the typhoons formed in the Western Pacific Ocean come inland, bringing along huge waves, windstorms, and fierce tides, causing tremendous casualties and losses on the part of people working offshore or living on the coast.

In order to better predict changes in the marine environment, China began constructing its monitoring network in the late 1950's by setting up its first group of monitoring stations and carrying out large-scale marine reconnaissance. To date, more than 50 marine monitoring stations have been set up in China, more than 200 merchant ships are involved in random hydrographic and meteorological observation, and aircraft remote sensing is applied to monitoring pollution, fishing zone water quality, and sea ice movement. Since March last year, six automatic monitoring buoys have been separately installed in the Nan Hai, Dong Hai, and Huang Hai.

China's marine environment forecasting service was begun in the mid-1960's. The State Marine Environment Forecast Center in Beijing and the three marine zone forecast stations in Qingdao, Shanghai, and Guangzhou form China's marine forecasting system. In 1982, China began to deliver a northwest Asia sea wave monitoring chart and a 24-hour sea wave forecasting chart through radio facsimile on four frequencies in compliance with the requirements set by the related international organizations. From July 1986 on, the average sea temperature forecast chart, which used to be delivered once a month, is

released every 10 days instead. In addition, a sea temperature monitoring chart is also delivered. In order to meet the needs of the vast number of customers in coastal areas, radio and television broadcasting stations began in around June and July of the same year to announce sea wave forecast, reports on wind, storms, and tides, sea temperature forecasts, and sea ice forecasts. Moreover, the State Marine Forecast Center also releases to departments concerned medium- and long-term marine meteorological forecasts in other forms. Feedback from customers shows that all these forecasts, with a pretty high degree of reliability, are useful in promptly giving safe warning to units engaged in maritime transportation, marine fishing, offshore oil drilling, and other sea operations. The social and economic benefits that the forecasting service contributes are immeasurable.

This forecast center has also extended many special services in recent years to meet the needs of its customers.

A source concerned revealed that the state will invest in the research of marine environment data forecasting and list it as a key state-run scientific and technological research project. The State Oceanography Bureau has also decided to extend the existing monitoring network and install six additional automatic marine monitoring buoys.

/12913

CSO: 4008/51

SATELLITE GROUND STATION MAKES CONTRIBUTIONS

HK270731 Beijing XINHUA Hong Kong Service in Chinese 0123 GMT 27 Apr 87

[Report: "China's First Satellite Ground Station is Making Special Contributions to Industrial and Agricultural Production and Construction"]

[Text] Beijing, 27 April (XINHUA)--Since its construction and operation in June of last year, China's first geological resources remote sensing satellite ground station has provided more than 70 departments throughout the country with many hundreds of pieces remote sensing satellite data, thus making special contributions to industrial and agricultural production and construction.

The satellite ground station was equipped with important foreign technological items imported by the Chinese Academy of Sciences during the Sixth 5-Year Plan. They included the latest technology for tracking and receiving microwave signals and for handling their figures, images, and photos.

Last year, the Chinese petroleum departments decided to artificially change the course of the Huang He to the sea to form a new alluvial fan and proceed to turn offshore oil production into onshore oil production. Using the satellite, Shengli oilfield chose the best proposition for changing the Huang He's course and conducted a survey of current land usage, thus laying the foundation for the smooth completion of the course-changing project, which has now been basically completed. After the alluvial fan is formed and onshore oil production started, more than 500 million yuan in investment can be saved on well-drilling alone.

The Lingtingyang district in the Zhu Jiang Estuary in Guangdong plans to reclaim land by filling in the sea on a large scale and then to live on and develop it. Through the help of the satellite remote sensing data, they conducted a survey of the district's beaches, sea depth, and silt content and gained an important scientific basis for working out a plan for land reclamation and cultivation.

Using the satellite remote sensing 1:50,000 pictures provided by the satellite ground station, a state farm on the Sanjiang Plains in the northeast conducted a survey of such fields as the current land use, acreage under cultivation, estimated wheat yields, and soil classification and obtained desirable results. Shanxi, Henan, Fujian, and Qinghai used the great quantity of

satellite remote sensing data provided by the satellite ground station and by the Huang He Water Conservancy Commission under the Ministry of Water Resources and Electric Power to draw up maps of land usage to conduct surveys of the current ecological environment, the distribution of crops, and the current state of forests.

Currently, the petroleum departments have decided to use remote sensing satellite data to survey the current situation of land usage in Liaohe, Dagang, Zhongyuan, and other oilfields and to make appropriate plans for it, to survey the depth of coastal waters, and to explore the possibility of using remote sensing data to discover new oilfields or to locate new well positions.

/12913

CS0: 4008/51

NATIONAL DEVELOPMENTS

WORK RELATED TO INVENTION AWARDS TO BE REFORMED

OW290820 Beijing XINHUA Domestic Service in Chinese 1104 GMT 28 Apr 87

[By reporter Zhou Peirong]

[Text] Beijing, 28 April (XINHUA)--The Recommendation and Examination Committee for Inventions under the State Science and Technology Commission announced at a press briefing today: The work of examining and selecting inventions for awards will be reformed this year; inventions will be periodically appraised and chosen for awards, and categories under which awards are applied for inventions will be announced before the start of the procedures for appraisal and approval of inventions for awards.

From now on, inventions will be appraised for state awards once a year. Awards are to be applied for inventions in late February every year. Inventions with which to apply for awards according to regulations will be published nationwide before the end of every April. Then, those inventions will be referred to recommendation and examination committees at various levels for appraisal. The three months following the publication of inventions will be a period during which a unit or individual that objects to particular published items may present its or his objections to the recommendation and Examination Committee for Inventions under the State Science and Technology Commission. Inventions will be examined after the three months of presenting objections. When an award is approved for an invention, it will be immediately issued; after this point, objections generally will no longer be accepted. From now on, state invention awards will be given in early November every year.

At today's press briefing, 279 items applying for 1987 state awards were made public. These items will be published in full in KEJI RIBAO [SCIENCE AND TECHNOLOGY JOURNAL] and JISHU SHICHANG BAO [TECHNOLOGY MARKET NEWS]. In addition, 32 other items are not to be published in the press because they have to be kept secret, but relevant departments will take appropriate measures to make them public.

/12913

CSO: 4008/51

CAS INSTITUTE HEADS DISCUSS PERSONNEL CHANGES

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 27 Jan 87 p 4

[Text] On the afternoon of 22 January, in the Beijing Office of the Director of the Chinese Academy of Sciences, famous academicians Lu Jiaxi [4151 0857 6932], Yan Dongsheng [0917 2639 3932], and Zhou Guangzhao [0719 0342 0664] told reporters about the reorganization of Chinese Academy of Sciences Leading Group.

On 22 January the Standing Committee of the National People's Congress decided to appoint Zhou Guangzhao President of the Chinese Academy of Sciences and Teng Teng [3326 3327] Vice President, and to remove Lu Jiaxi from his post as President of the Chinese Academy of Sciences and Yan Dongzheng from his post as Vice President of the Chinese Academy of Sciences.

Lu Jiaxi joked, "I am already 71.2 years old, Dongsheng is 68.9 years old, averaged together we are over 70 years old. For someone to live to 70 has been rare and the over 120 institutes and more than 80,000 people in the Academy of Sciences is such a large load that when one gets old he does not have enough energy. Last year Dongsheng and I studied many times how to get middle-aged cadres into the front line and us withdraw to the second line and we made a report to the Central Committee.

Lu Jiaxi said that this recent academy leadership reorganization has been under consideration for a long time and is very normal. However, outside there have been some speculation which does not conform with reality. Yesterday morning he received a long-distance phone call from his daughter who is studying in the United States asking him what was going on. I told her, "Why should anything be going on? Everything's normal." When he had finished, Lu Jiaxi laughed."

Yan Dongsheng said: Jiaxi and I came to Beijing in February 1981 to take on work at the Chinese Academy of Sciences. Jiaxi was President and I was Vice President. We have now been here 6 years. Guangzhao has worked with us for several years. He is very capable. We believe that he and the new team will certainly be able to bring the Academy of Sciences more vigor.

Newly appointed President and famous nuclear physicist Zhou Guangzhao said that Lu Jiaxi and Yan Dongsheng had made contributions to the reform of the Academy of Sciences during their terms. He also said that stressing spiritual culture also began at the Academy of Sciences very early. Zhou Guangzhao said with great feeling: "I have worked together with these old scientists Lu and Yan for over 2 years and I have learned a great many things from them. Their spirit of devoting their lives to science deserves respect. The new party organization has already decided to ask these two old scientists to serve as special advisors to the Chinese Academy of Sciences. There is still much work in the Academy to be entrusted to them and for important policy decisions we will ask their advice."

8226/9190

CSO: 4008/2055

DEFENSE INDUSTRY DEVELOPMENT OF CIVILIAN PRODUCTS IN 1986

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 26 Jan 87 p 1

[Article: "Military Industries Show Talent At Developing Civilian Products, Last Year Value of Civilian Products Output Over 6.2 Billion Yuan"]

[Text] Serving the needs of national economic construction, the national defense science and technology industry has actively vacated its technological forces and equipment to participate in the four modernizations and has made big steps forward. According to statistics from relevant departments, last year the value of civilian products produced reached 6.228 billion yuan, an 8.5 percent increase over 1985.

Since 1980 the national defense science and technology industry has conscientiously implemented the direction of the Central Committee concerning combining military and civilian, taken full advantage of its own superiority in technology and equipment, actively set up production of civilian products, up to the present creating over 400 production lines especially for making civilian products, and has won 59 national gold and silver prizes for civilian products. Of the over 400 military industry enterprises, more than two-thirds are dedicated to supporting civilian products enterprises, and the value of their civilian products output is over 50 percent of the total output value of the enterprises.

Last year, the national defense science and technology industry departments implemented a major reform. In the year of implementing the strategic shift, under the guidance of the principle of combining military and civilian, and while guaranteeing national defense scientific research production, they have greatly increased the pace of civilian products production. The majority of enterprises are moving towards joint military-civilian enterprises and have also formed many very vigorous enterprise groups and enterprise mass bodies.

The civilian products which the military industry enterprises have put into production are a very important force in national economic construction. It directly provided a great deal of technical equipment for sectors of the national economy and provided products of daily use in the light industry market to make the market prosper. According to statistics, from January to November of last year alone it produced over 130,000

automobiles, 400,000 motorcycles, 800,000 bicycles, 300,000 electric refrigerators, and over 400,000 television sets. At the same time it also provided products to expand the export market, last year and the year before last alone, the national defense science industry committee provided over 450 science and technology research results to the international trade committee and the volume of business reached more than 2 billion yuan. In the past, since some military industry enterprises had inadequate military products production missions, it was hard to sustain life and they had to rely on the state for suitable subsidies. Implementing combining military and civilian has made the path of military industry enterprises broader and broader.

8226/9190

CSO: 4008/2055

NATIONAL DEVELOPMENTS

SHANGHAI BRANCH OF CAS NOTES MAJOR S&T ACHIEVEMENTS

Beijing KEJI RIBAO in Chinese 27 Jan 87 p 1

[Text] Science research at the Chinese Academy of Sciences, Shanghai Branch, has netted a group of major achievements, where 225 items in 1986 passed evaluations or appraisals and were confirmed. Fifteen among these were in the forefront of international levels, and 99 attained internationally advanced levels.

The Shanghai Institute of Pharmaceuticals completed the complete synthesis of maytansine. This is highly difficult work that only a few countries in the world have been able to undertake, which indicates that fine organic synthesis has taken its place among the world's advanced. The determination of the primary structure and spatial structure of the root of Chinese trichosanthes by the Shanghai Organic Institute is the first independently achieved protein structure in this country since determination of the structure of the insulin series, and is also currently the first complete free-space model to terminate gestation proteins to be accomplished internationally. The "inorganic glass physical nature calculations and composition designs" of the Shanghai Optics and Fine Mechanics Institute studied the correspondences between tens of compound components and more than 10 physical properties, and used the computer to establish the world's most complete computation system, which has a quite broad range of applications; the two monographs and tens of papers published by this institute have been quoted in relevant textbooks both domestic and foreign.

Among 225 achievements, the achievements of applied research and developmental research are in the majority. The "high performance 16-bit microprocessor CPU circuits" of the Shanghai Institute of Metallurgy has been a major problem-solving project commissioned by the State Council Electronics Industry Invigoration Leading Group. It is the core component in developing top-end microcomputers in this country, the level of difficulty in both technique and technology is high, and its successful development has provided the conditions for the nationalization of integrated circuits. The "development of the technology to synthesize (erlujusuan yizhi) from (jiayiwuerxi)" has passed evaluation after intermediate testing, produces 10 tons annually, and has an output value of 1 million yuan.

12586
CSO: 4008/2064

NATIONAL DEVELOPMENTS

REPORT ON S&T LEGISLATION CONFERENCE

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 14 Feb 87 p 4

[Report by Yang Shiguang [2799 2514 0342] and Chen Zujia [7115 4371 3946]:
"Science and Technology in This Country Gets on Track With the Legal System"]

[Text] Over recent years, S&T efforts in China have been gradually getting onto the track of the legal system, and S&T legislation is just in the ascendancy.

On the 13th of this month, Hu Keshi [5170 0344 1395], vice chairman of the National People's Congress Education, Science, Culture, and Public Health Committee described the situation regarding progress in S&T legislation to the national conference on research into S&T legislation. He said that over the last few years we have formulated more than 20 laws and regulations having to do with science and technology, and the draft of technology contract legislation has been turned over to the Standing Committee of the National People's Congress for consideration. This shows that S&T legislation has been put on the agendas of national authorities and of administrative organs.

He said that the laws and regulations that have been formulated are in accordance with the spirit of the constitution, that they protect socialist public ownership, correctly handle relations between the three parties of state, groups, and individuals, and that they place the interests of the state and the people in the primary position; they embody the principle of socialist allocation and meet the demands of a socialist planned developing commodity economy. These laws and regulations have implemented the fundamental principles of reform, opening up, and invigoration, which is in keeping with the demands of restructuring and which have ensured the development of the S&T mission.

Hu Keshi said that the S&T legislative task in this country is an enormous one, and strictly speaking, we are still at a preliminary stage. To do a good job with S&T legislation we should learn from foreign experiences and establish the spirit of democracy, realism, and the courage to explore at study conferences, and we should advocate the free expression of contending opinions in order to learn from the strengths of others and to offset our own weaknesses.

The vice minister of the State Science and Technology Commission, Wu Mingyu [0702 2494 3842], stressed in his speech that to enhance S&T legislation we must be in close harmony with the current restructuring of the S&T system, and should legislate, standardize, and systematize the trillion things that the public has created during the restructuring to solidify the achievements of the developing restructuring.

This occasion of the meeting jointly convened by the State Science and Technology Commission and the National People's Congress Education, Science, Culture, and Public Health Committee will bring together and exchange experiences in S&T legislation, and there will be an appraisal of research topics in the soft sciences of S&T legislation, as well as discussion and revision of S&T institute laws and those for S&T societies.

12586

CSO: 4008/2064

NATIONAL DEVELOPMENTS

NDSTIC-AFFILIATED UNITS' ACTIVITIES NOTED

Beijing KEJI RIBAO in Chinese 25 Jan 87 p 2

[Report by Yuan Bin [0626 1755]: "National Defense Science, Technology, and Industry Commission Has Outstanding Record in Supporting Local Construction"]

[Text] Bases, academies and schools, and institutes affiliated with the National Defense Science, Technology, and Industry Commission (NDSTIC) have maintained the principles of restructuring and of opening to the outside, have made the most of technology, skilled personnel, and equipment, and have actively served national economic construction. Over the past 4 years they have participated in 44 major national and local engineering projects and have completed or contracted for 541 items of technology development, the transfer of rights to technologies, and technical consulting. They have helped localities train more than 5,000 engineers and technicians of all kinds, have a gross output value of more than 26 million yuan, have netted profits of 6.43 million yuan, and have made positive contributions to supporting the building up of socialist modernization.

There is a technical contingent of the NDSTIC that is centered on science research and experimentation, that has the technical advantages of many scientists and technicians, abundant technical power, advanced equipment, complete materials, and a high degree of automation. In the technical fields of control, remote sensing, remote measurement, remote control, data processing, and automated management, this contingent is in the front ranks domestically. Since the NDSTIC began S&T assistance to civilian activities in 1984, after constant practice and review, this has changed being from provisional and undetermined to long-term, fixed technical cooperation.

The NDSTIC has developed primary forms for S&T assistance to civilian activities, which include the contracting for technology development and design in major national and local engineering projects, assistance to small to medium enterprises in technology transformation, cooperation with relevant units in projects for the absorption and assimilation of imported technologies, wide-ranging technical consulting and technology transferral, and the training of technical personnel.

The second-stage transformation project at the Shanghai Jinshan Main Chemical Plant is a major project of the national Seventh 5-Year Plan. The Dacron

Factory No 2 of this plant brought in a set of advanced equipment from abroad that can produce 200,000 tons of polyesters annually. To make the most of the production capacity of this equipment, in September of last year the NDSTIC Academy of Control Technology formulated "Tentative Plans for an Overall System of Automated Management" and completed the design tasking for "computer network structures," all in accordance with the "preliminary authorization for design tasking" as put forward by this plant. After establishment of this "network structure," production and operations management at this plant was automated, which included production control, funding management, process control, and monitoring, and yearly output of polyester reached 260,000 tons. An institute of the NDSTIC signed a contract with the up-and-coming Panzhuhua Steel Co of the iron and steel industry in this country to establish a computer-management system. After this system has been constructed, it will bring about the automation of this company, as well as of production and operations management between primary plants (departments) and of offices, which will improve production quantities, will develop production, and will play an important part in science management.

The Sicun Township Papermill in Pingjiang County, Hunan Province, is a small cooperative enterprise. Having no way to solve the problem of handling sewage, it was forced to cease operations. Early last year, in view of the fact that this area produces mica, the National Defense Science and Technology University suggested that it change to making mica paper, which is in short supply both domestically and abroad, and it sent people to help this plant undertake technical problem solving. After efforts of only some 5 months, they produced a test product. After testing by pertinent sectors, all indices reached national standards and some attained international levels for similar products. Some factories in this country and also foreign commercial interests vied to place orders, and sales are now as far away as West Germany and the United States, which has allowed this small plant that was on the verge of bankruptcy to be reborn.

In giving S&T help to civilian activities, units affiliated with the NDSTIC have focused on helping localities resolve problems in getting quick results, high benefits, and technical difficulties in urgent need of resolution. For example, to mitigate the problem of tight supplies of coal gas, Beijing Municipality has made plans to build the Beiyuan Coal Gas Filling Plant. An institute of the NDSTIC designed an automatic management system for this plant, and also helped to install debugging equipment and to train technical personnel, all of which allowed this plant to be completely automated throughout the processes of rinsing, gas filling, and measurement.

12586

CSO: 4008/2064

NATIONAL DEVELOPMENTS

NDSTIC UNITS' S&T TRADE FAIR ACTIVITIES

Beijing KEJI RIBAO in Chinese 25 Jan 87 p 2

[Report by Xi Qixin [1153 0796 2450]: "Institute Affiliated Units Actively Participate in Technology Trade"]

[Text] Units affiliated with the National Defense Science, Technology, and Industry Commission (NDSTIC) have fallen in with the general trends of national economic construction and are giving full rein to the social benefits of national defense science and technology. They are actively taking part in technology trade activities, and over the past 2 years have provided more than 450 science research achievements for large national trade fairs in trade volumes nearing 20 million yuan.

At the first All-China Technology Achievements Trade Fair, units affiliated with the NDSTIC provided more than 190 science research achievements, 184 of which were part of transactions. The ligneous plastics production technique of the NDSTIC had 15 customers requesting the transfer of rights to this technology, with trade volume of over 6 million yuan. Applied chemical products of the NDSTIC logistics department were welcomed by many firms, and to date more than 60 units have contracted for the transfer of rights to those technologies or have signed letters of agreement, the volume of trade for which is more than 1.4 million yuan. Originally, the Qinghua University Institute of Nuclear Energy planned to buy a certain transducer from abroad. At the trade fair, they saw a transducer product that a certain test base had produced that was of the type they needed. Since the technical indices were no lower than those of similar products abroad, they decided to buy from this base.

At the All-Services Export Commodities Joint Exhibition, they once again exhibited 192 new quality products and technologies. Among these, products such as the numerically-controlled wire electrode arc cutter, supercomputer, subminiature computer, speech simulator, and harmonic decelerator received the praise of leading comrades of the Central Committee.

Units affiliated with the NDSTIC also participated for the first time last year in the technology trade activities of the fall Guangzhou Trade Fair and the China Shenzhen Technology Trade Fair. They provided more than 70 products

and technologies for the trade fair, attracted the attention of foreign commercial interests, and all together had more than 40 companies enter into negotiations with them. These products and technologies have created the conditions for entrance into the international marketplace.

12586

CSO: 4008/2064

NATIONAL DEVELOPMENTS

NDSTIC DESIGN INSTITUTE AIDS LOCAL CONSTRUCTION PROJECTS

Beijing KEJI RIBAO in Chinese 25 Jan 87 p 2

[Report by Li Peicai [2621 1014 2088]: "Institute of Engineering Design of the National Defense Science, Technology, and Industry Commission Ardently Takes on Local Design Projects"]

[Text] At the same time as the Engineering Design Institute of the National Defense Science, Technology, and Industry Commission (NDSTIC) was completing certain military design tasks, it was also actively taking on the responsibility for local science research design tasking. Since 1985, it has completed a total of 91 relatively large civilian projects, surveyed more than 20 projects, and made contributions to the development of the national economy.

The NDSTIC Engineering Design Institute is one of the premier design units in this country. In the process of supporting local construction, they have been bold about getting involved with difficult things. They have always proceeded in accordance with their abilities, actively taking responsibility for projects requiring tight security and special techniques, and that were urgent with little time for design. At the Beijing Municipality Coal Gas Co Northern Suburbs Gas Filling Plant, a great deal of the vessel filling and emptying in the past depended upon manual labor. Efficiency was low, quality was deficient, and they were in urgent need of equipment with a fairly high degree of automation. They went to various design academies, all of which pleaded difficulties. After the Engineering Design Institute accepted responsibility for this task, they designed an automated control system in accordance with the requirements of the applying units and in keeping with the various processes involving gas temperatures, pressures, leak densities, and emptying. Management is through microprocessor control. After this project had been established, the time required for filling and emptying vessels was greatly reduced, and this will serve to moderate the tense situation regarding use of gas in Beijing Municipality. The one principle that the Engineering Design Institute has self-consciously upheld as it has aided local construction is to be concerned about what concerns the locality and to keep in mind what they have in mind. Over the past 2 years, the local design, measurement, and drilling tasking that they have taken on has all been handled in complete accordance with contract provisions. In early November 1985, the design-tasking documents were issued for a 12-story hotel for the Beijing

Pharmaceutical Plant No 3, requiring that some of the construction plans be turned over by the end of December. Time was short, the task difficult, and local design units were unwilling to accept the responsibility. After a search, the Engineering Design Institute took on the responsibility for the design. During the design process, the other party several times changed the usage requirements, but the scientists and technicians were very patient and turned in their blueprints on time, ensuring that the contracting party could break ground and start construction on time.

UNESCO once presented the Central Academy of Opera and Ballet with adjustable lighting equipment, and this mechanical theater equipment was of a rather advanced world standard. This was turned over to two institutes in Beijing for development, the contracting party providing 30,000 yuan for development expenses, also requesting the additional development of auxiliary equipment. The Academy of Opera and Ballet had difficulties fulfilling these conditions. After the Engineering Design Institute accepted this tasking, it sent people to the locality for study, and by investigating and collecting technical materials, it was able to accomplish the development tasking with only 12,000 yuan.

12586

CSO: 4008/2064

NATIONAL DEVELOPMENTS

MAI, SHAANXI LIGHT, TEXTILE INDUSTRIES COOPERATION

Beijing KEJI RIBAO in Chinese 12 Jan 87 p 1

[Report by Zhang Gefei [1728 2047 2431] and Yu Jing [6657 7234]: "The Ministry of Aeronautics Will Put Their Technical Advantages into the Main Battleground to Actively Provide Technical Service to the Textile Sector"]

[Text] Recently, the Ministry of Aeronautics Industry (MAI) joined with the Ministry of Textile Industry and Shaanxi Province to establish the "Shaanxi Development Center for New Types of Textile Machinery Technical Organizations." The establishment of this textile machinery base is a manifestation of MAI putting its intellectual advantages into the guiding ideology of the "main battleground" of economic construction.

MAI has powerful superiorities in all the areas of technology and equipment and scientific and technical personnel. They have confronted the weaknesses in the capabilities of light industrial and textile technology, as well as the present situation in urgent need of revitalization, and has taken the initiative in breaking through departmental boundaries in the textile industry, in recent years, to develop and manufacture textile machinery and equipment such as pneumatic spinning machines and water jet looms, and they have made a large number of complementary products; and for light industry they have developed and manufactured machinery and equipment such as automatic and semiautomatic can resistance seam soldering machines, plastic injecting machinery, and leather processing machines.

In providing technical services to light industry and to the textile industry, MAI has stressed the resolution of key technical difficulties in those industries, on providing complementary technology and equipment for those industries, and on raising the level of technology for all the industries. For example, a bean milk production line that has improved the entire set of equipment from sifting, to fine grinding, to separation, to sterilization, and to the final product, allowing the enterprise to quickly constitute a production capability.

To implement policies by the Central Committee regarding the invigoration of the light and textile industries, MAI has resolved to treat this department as the technical equipment department for the light and textile industries. They are using the excellent technology and equipment of this department to

organize scientific and technical capabilities and production strengths, and in a directional, long term, and specialized way to engage in the development and production of advanced modern light industrial and textile machinery. Currently, with the goals in mind of confronting the technical transformation and production development of the light and textile industries, the Ministry of Aeronautic Industry is organizing the production capabilities of nearly 8,000 scientists and technicians and of 80,000 workers, and is mobilizing nearly 80 enterprises, institutes, and higher institutions to begin by absorbing and assimilating imported technology and with scientific and technical problem solving. They are to implement lateral associations that are of multiple formats and are hierarchical, which will bring prosperity to the light and textile industries in this country and improve the capacity for light industrial and textile exports to generate foreign exchange.

12586

CSO: 4008/2054

SHAANXI S&T SYSTEM RESTRUCTURING PROGRESS REPORT

Xian SHAANXI RIBAO in Chinese 18 Dec 86 p 1

[Report by Luo Qingshan [5012 7230 1472]: "There Is A Brisk Dynamism to Science and Technology Efforts in Shaanxi"]

[Text] At the 21st meeting of the Standing Committee of the provincial 6th People's congress, Liang Qi [2733 3823], chair of the provincial science and technology commission, gave "A Report on the Situation Regarding the Restructuring of the Science and Technology System in this Province." She said that reforms in the science and technology system in Shaanxi have made significant advances, and that scientific and technical efforts have begun to exhibit a brisk dynamism in catering to economic construction.

As of now, 48 development institutes in this province at the prefectural level or higher have for the most part put technical contracting systems into effect, and 4 institutes have achieved funding self-reliance. The majority of agricultural and some of the social welfare and technology basic research institutes have also arranged for income through various means such as using the transfer of rights to technologies and technical services, all under the premise of first completing tasking from national planning. Last year, income for institutes at the prefectural level or higher in this province reached a total of more than 63 million yuan, a tenfold increase over that of last year. If we are to do a good job getting science research to serve economic construction, we must vigorously bring about the transformation of scientific research achievements into material commodities as quickly as possible and in greater quantities. We must open up the technology markets, make technology trade prosper, and bring about the commercialization of research achievements. Over the past 2 years, the science and technology achievement trade fairs that have sprung up in all areas in this province have been the result of trends at this time.

It is especially worth mentioning that over the past 2 years science and technology efforts in this province have exhibited good momentum in catering to the countryside and to the town and township enterprises. Last year, this province arranged 44 "short, even, and quick" projects, which supported the use of new technologies by town and township enterprises and the development of new products. At the same time, 2.5 million yuan was set aside for helping 30 counties establish science and technology development centers on the basis

of equal investment. By acting as go-betweens, a group of town and township enterprises were aided in establishing cooperative relations with more than 1,300 research and educational units both within the province and outside it, and they brought in more than 400 items of new technology and new products. By using the resources of an area to develop more than 160 new products, totaling more than 300 varieties, the yearly output value reached more than 36 million yuan, with profits of 9.5 million yuan.

12586

CSO: 4008/2054

ROLE OF SCIENCE ASSOCIATIONS IN INDUSTRIES

Beijing KEJI RIBAO in Chinese 5 Jan 87 p 2

[Report by Zheng Tianfen [6774 3944 5358]: "3,500 Medium to Large Factories and Mines Establish Science Association Organizations, and These Play an Outstanding Role in the Restructuring and in Technology Advances"]

[Text] On 25 December 1986, at the All-China Conference on Work With Science Associations in Factories and Mines that was held in Shenyang, Cao Lingzhong, Secretariat Member of the China Association for Science and Technology (CAST), spoke glowingly of the important role of factory and mine science associations during the restructuring.

They have promoted all the technical advances in enterprises and the improvement of standards for operations management. For several years, the science associations in factories and mines in all areas have focussed on the directions for development, the development of new products, major technological transformations, and the importation of technology, all for the particular enterprise. They have also made advances in the topics of operations management, and have broadly developed such activities as unprecedented demonstrations, technology problem solving, scientific and technical suggestions, and various merit competitions, all of which have promoted technological advances in the enterprises.

They have established technical and economic lateral associations between enterprises, and have promoted the growth of small to medium enterprises and town and township enterprises. Over the past few years, through various public technology exchanges and technical service activities, science associations in factories and mines throughout the country have broken through the limits defined by traditional divisions between enterprises to both uncover the potential of scientists and technicians and also provide technological support for small to medium enterprises and town and township enterprises.

They have actively developed activities in scholastic exchanges and knowledge renewal, which have improved the professional qualities of scientists and technicians. Science associations in factories and mines in 6 provinces and cities such as Shanghai, Sichuan, and Hubei have for several years held a

total of more than 4,000 training classes, at which some 210,000 people have attended.

They have done a good job with "the family of scientists and technicians," as they have provided a link between enterprise party and government leaders on the one hand and scientists and technicians on the other. Science associations in factories and mines in all areas have been concerned about scientists and technicians in all aspects. They have reflected their voices and demands, and in the areas of job evaluations and promotions and wages they have done many real and good things for scientists and technicians, and this has promoted the building of the spiritual culture in science and technology contingents.

Cao Lingzhong pointed out that for some years now abundant actual practice by science associations in factories and mines has fully explained the fact that the establishment of science associations in factories and mines meets the needs of the restructuring and of the development of the cause of science and technology. And those groups meet a pressing need for the cause of science and technology in the factories and mines. It may be predicted that as the cause of science and technology continues to grow and prosper, and as enterprise technologies continue to advance, science associations in factories and mines will be all the more vigorous and vital.

12586

CSO: 4008/2054

PROBLEMS OF S&T PERSONNEL IN INDUSTRIES DISCUSSED

Beijing KEJI RIBAO in Chinese 5 Jan 87 p 2

[Excerpt] At the All-China Conference on Efforts of Science Associations in Factories and Mines held 25 December 1986, Wu Jiuling [2976 3773 3781], deputy chair of the Tianjin Municipal Economics Commission, summed up the work practices of more than 20 years, providing her own view on the problem of how to make the most of the function of scientists and technicians in factories, mines, and enterprises.

After Wu Jiuling had graduated from Qinghua University, she was involved for a long time with product design at the Tianjin Electric Machinery Plant, after which she was transferred to the Municipal Office of Machinery and then the Municipal Economics Commission, where she is responsible for efforts in industrial management. She feels that urban science association efforts primarily cater to the industrial economy, so that the focus of those efforts should be on science associations in factories and mines; to truly realize the potential of science associations in factories and mines we must first of all fully affirm the roles played by scientists and technicians in the mines and factories in economic development. Wu Jiuling then used the situation in Tianjin to illustrate this problem.

It appears from the figures that the proportion of scientists and technicians in the mines and factories to scientists and technicians in the city as a whole is rather large. According to statistics, scientists and technicians in mines and factories in Tianjin are 78 percent of scientists and technicians in all city industries; from the point of view of levels, many medium to large enterprises themselves are technology development centers for the whole nation; looking at achievements, 64 percent of achievements from enterprises throughout the city have come from the hands of scientists and technicians in that particular unit; from the point of view of position, scientists and technicians in the mines and factories are integrators of science and technology with production, they are "born and bred" within the particular unit, they have abundant production practice and experience, and they are responsible for the transformation of scientific and technical achievements into production; from the point of view of development, the future "heroes" of the industrial stage will be enterprise groups, and with the restructuring of the system for science and technology allocations by the state, this is sure to cause some academies and institutes to place more emphasis on catering to

economic construction. Therefore, the strength of scientists and technicians in the mines, factories, and enterprises will continue to increase.

Well then, what is the hurry to fulfill the roles of scientists and technicians in the mines and factories? It is Wu Jiuling's belief that the first thing is to restructure the system of management for scientists and technicians in the mines and factories. Currently, whenever the subject of implementing policies for intellectuals is mentioned, the first thing people think of are the institutes, academies, and higher institutions. But the offices of science cadre of the science and technology commissions do not bother to ask about the portion of scientists and technicians of whom we speak, and the economics commissions managing the enterprises do not manage them. During readjustments of cadre, some factories have considered scientists and technicians as the first line of production personnel; when giving bonuses to the first line workers, they then reassign scientists and technicians to the ranks of non-production personnel. Scientists and technicians in the mines and factories have become "orphans," so how is their enthusiasm to be motivated?

Also, we must eliminate old concepts, affirm the value of the intellectual labor of scientists and technicians in the mines and factories, affirm their contributions, and also provide them with reasonable recompense. Currently, when scientists and technicians are outside the mines and factories contracting to town and township enterprises they may keep a percentage of the money they generate, but when producing achievements in technology problem solving for their home factory, they may not be additionally compensated. This leads to the situation where some scientists and technicians are unwilling to exert themselves for technological transformation, but instead place the bulk of their energies into developing technical services for outside interests.

12586

CSO: 4008/2054

OCEANOGRAPHY SURVEY BASE HELPS LOCAL SHIPBREAKING WORK

Beijing KEJI RIBAO in Chinese 25 Jan 87 p 2

[Article by Wang Wenqing [3076 2429 1987]: "Resolving Difficulties for Township Enterprises"]

[Text] The Oceanography Survey-ship Base of the National Defense Science, Technology, and Industrial Commission has made full use of its advantages regarding skilled technical personnel and equipment in actively supporting the local shipbreaking industry. In recent years, they have broken 8,700 tons of surface vessels, have beached 39 10,000 ton-class scrapped ships, and have profited 1.7 million yuan thereby.

In June 1984 this base established the "department of long-range production technology development," organized classes in operating ships, and resolved some difficulties for some township shipbreaking plants that "knew how to take ships apart, but not how to pilot them." The Xijiao Shipbreaking Plant in Jiangyang County received an obsolete foreign steamer at Nantong Harbor in May 1985. Problems developed on the trip home, the ship ran aground, and they hurried back to the base for help. They immediately dispatched Captain Fu Yongsheng [0265 3057 3932] and others. Shortly before the ship was to be dismantled, there were numerous malfunctions and the temperature in the engine compartment reached 40 degrees Centigrade. At the time they took over the ship, technical materials available to them were not very complete, some even still in their foreign editions. They translated the materials while they forced themselves to rush to repair the ship, and struggled for 6 days and nights, finally getting the main engine to operate normally. After this, they tried beaching it six times in 1 day, finally getting it onto the beach.

The Oceanography Survey-ship Base has also initiated military-civilian joint construction activities to support local economic construction. In June 1984, they began joint operation of a shipbreaking plant together with the Jiangyang County Xiaoshan Brigade, a link-point unit with the military-civilian joint construction. By the end of 1986, they had dismantled nine 10,000 ton-class scrapped ships, sold 70,000 tons of steel to the state, and brought in 800,000 yuan. In June 1986 it was designated a permanent plant of the Shanghai branch company by the main shipbreaking company.

12586

CSO: 4008/2064

CHINESE SHIPBUILDING WEATHERS BLEAK MARKET

Beijing RENMIN RIBAO OVERSEAS EDITION in Chinese 17 Jan 87 p 1

[Report by Zhang Pingling [1728 1627 0500]: "Major Breakthroughs Are Made in China's Shipbuilding Industrial Technology"]

[Text] Last year, major breakthroughs were made in the level of technology in China's shipbuilding industry. The first 115,000 ton-class oil tanker built with contemporary internationally advanced technology has now been launched in China; the world's most advanced 20,000 horsepower low-speed diesel engines appeared for the first time last year in the shipbuilding industry of China; designs for more than 20 new types of ships are now being completed by our primary shipbuilding enterprises, and we have successfully built the first oil drilling platform module with advanced performance and having complex construction. And computers are now in general use in China for ship design and for building.

Personnel connected with the State Shipbuilding Corporation revealed the other day that last year China ship exports in this country exceeded national planning by 18 percent, and the shipbuilding enterprise managed by this corporation last year achieved a gross output of more than 3.2 billion yuan, a growth of 3 percent over the previous year, and the tonnage of ships built grew 18.1 percent over the previous year. Gross tonnage reached 845,000 tons, the highest level in history.

In recent years, the international ship marketplace has remained bleak, and domestic ship orders have been drastically reduced. The State Shipbuilding Corporation has been faced with countless difficulties, but during the deepening restructuring last year of the affiliated enterprise, they diligently promoted lateral economic associations with enterprises and arranged more than 400 joint projects, which effectively strengthened the real economic and technical power of the shipbuilding enterprises. The Shanghai Institute No 708 and the Jiangnan Shipbuilding Yard jointly developed a 16,000 ton freighter, which was the successful bid in international open bidding of the Zhongbo Steamship Company. The State Shipbuilding Corporation has also actively made inroads to the international market, trying its best to get orders from abroad. Last year it was successful in exporting 13 vessels, totaling over 240,000 tons.

According to analysis by persons affiliated with the State Shipbuilding Corporation, the bleakness of the international shipbuilding industry will not be resolved this year, but this corporation has been able this year to carry out the export of ships totaling 300,000 tons, primarily by using the technical advantages already present in China's shipbuilding industry, and has also taken on some specialty ships having greater technical difficulties.

12586

CSO: 4008/2053

COASTAL-INTERIOR TECHNICAL EXCHANGE PROJECTS REPORTED

Beijing KEJI RIBAO in Chinese 6 Jan 87 p 2

[Report by Li Zhenghua [2621 2973 5478], Hua Huiyi [5478 1920 3015], and Tong Baogen [4547 1405 2704]: "Adopt the Method of Simultaneously Developing Importing and Exporting, and Broaden the Avenues for Technical Cooperation"]

[Text] Economic and technical cooperation between some industrial cities in the Shanghai economic zone and interior regions has in recent years changed from one-sided provision of technical assistance to the interior regions to bringing back at the same time top-quality technology from the interior. People in economic circles feel that this method of "simultaneous development of importing and exporting" has broadened the avenues of economic and technical cooperation, and has benefited the promotion of shared growth both along the coast and in the interior.

All industrial cities in the Shanghai economic zone have come to realize through years of economic and technical cooperation that the developing economies of interior villages and small to medium townships require the technical and economic assistance of the coastal region; however, some military industrial enterprises and research units in the interior have rather advanced technology and equipment. They are reservoirs of energy, and much of the advanced technology and equipment needed for the improvement of economic levels in the coastal regions may be obtained in the interior.

Jiaxing City, located on the Hangzhou-Jiaxing-Tai Hu plain, established a large scale enterprise cooperative in 1985 in the interior together with the Ministry of Electronics. In less than 1 year they jointly developed various electronic products such as recording speech cylinders, computerized telephones, and automatic noise detectors. From this fact, the Jiaxing City government saw a broadened perspective for bringing in advanced technology and equipment from the interior, and promptly drew up preferential policies to boldly bring in technology and skilled personnel from the interior. They also set aside 900 mu of land to concentrate construction in the implementation of an electronics industrial zone for rising new technologies. Currently, 15 large enterprises from Sichuan, Jiangxi, Guizhou, and Shaanxi have invested in Jiaxing, the total funds invested being 180 million yuan to develop more than 10 electronic products.

In recent years, Wuxi City has imported a number of (jian gan) looms from abroad, and because they have lacked the ability to assimilate these, they must spend another great amount of foreign exchange each year to import parts. In 1985, a textile machinery plant in Wuxi and a large enterprise in Shaanxi joined together to jointly absorb the advanced foreign technology using the skilled personnel and technical advantages of the enterprises. They quickly manufactured parts for the (jian gan) looms. Now, the parts jointly manufactured by the enterprises have replaced some of the imported fittings.

The scale of the Suzhou City Forging Plant used to be small, and it had a low level of technology, only able to process a few small forged parts. In 1986, they joined with a large scale forging specialties plant established in Guizhou by the Ministry of Astronautics to establish a forging center at the Suzhou Forging Plant using advanced technology and equipment provided by the larger plant. This center has not only satisfied the needs of the Suzhou region for processing large forged parts, but it is now no longer necessary to ship some of the forged parts from neighboring cities into the interior for processing. According to incomplete statistics, the city of Suzhou has signed agreements with large enterprises and research units in the interior to bring in 47 high-quality technologies, and a large number of intended projects for importation have also been proposed.

"Importing" promotes "exporting," and some enterprises on the coast have greatly hastened the pace at which appropriate technologies are exported to the interior. According to a description by the Shanghai Economic Zone Office of Planning, since 1985 the 3 cities of Suzhou, Wuxi, and Nantong have exported nearly 100 different items of technology to the interior. At present, there are more than 1,000 joint economic and technical cooperative projects of Shanghai Municipality with the interior, more than 300 million yuan in funds have been provided, and the fields of export technologies involve the industrial, agricultural, commercial, scientific and technical, and educational, and they are in gradual transition to the high level structures of software development.

12586

CSO: 4008/2053

OFFICIAL CLAIMS S&T CONSULTING SERVICES UNFAIRLY CRITICIZED

Beijing KEJI RIBAO in Chinese 8 Jan 87 p 4

[Interview with Li Baoheng, Member of the Secretariat of the China Association for Science and Technology, by Kuang Yongcheng [0562 3057 2052]: "We Should Better Support and Encourage Work in Consulting"]

[Text] Early in the morning this reporter came to the office of the China Association for Science and Technology (CAST) Secretariat member Li Baoheng, and after explaining my purpose to him, Li Baoheng laughed heartily and said, "Fine! Scientific and technical consulting is very important, but there are lots of problems!"

"What kind of problems"

Li Baoheng did not immediately answer my question, but held out a chart, saying, "It would be better to let the figures speak!" I saw a chart that reflected the monthly amounts in contracts for completed consulting services for the previous 2 years at the Shanghai Municipal Science and Technology Consulting Service Center.

Li Baoheng said with some feeling, "You can see clearly from this chart that growth in early 1985 was quick, reaching at its peak 3.77 million yuan, but beginning in the latter half of the year, there was a dramatic drop in consulting services." Here, he pointed to the bottom of the trough on the chart and said, "In May 1986, contract amounts fell to their lowest point, to only 200,000 yuan."

"Was this trend true throughout the country?," I went on to ask. Li Baoheng said, "It was not only like this in Shanghai, but there was a tendency toward great declines in scientific and technical consulting in many areas. For example, at the Liaoning Province Science Association Consulting Center, when you compare the first half of 1985 with the same period in 1986, the number of projects transacted were 1,393 and 336, respectively, a drop of 75 percent. Transaction volumes were 33.65 million yuan and 5.61 million yuan, respectively, a drop of 83 percent."

At this point, he lost himself in thought for a moment. "The problem isn't just in this. Many scientists and technicians who have engaged in consulting services have been treated unjustly. Some have been criticized and blamed, and some have been punished, even to the point of incarceration."

He did not wait for a response, but said again, "Now why would we experience such a dramatic drop? It was an unavoidable consequence of criticizing excessive encouragement of scientific and technical consulting and of limiting excessive support. Later, we jointly authored a document with the Ministry of Finance that provided something in the way of preferences, only after which did scientific and technical consulting gradually come out of its trough, and did contract amounts begin a slow climb."

Li Baoheng went on to say that science and technology consulting is in keeping with the strategic policy of the Central Committee regarding the fact that science and technology must cater to economic construction. It is a product of the restructuring, and is in compliance with the demands of our socialist modernization. In another sense, scientists and technicians in this country are distributed quite unevenly, with a great number concentrated in a small number of institutes and educational units. For this reason, through consulting services they can make more of their roles, which is one good way to serve society. As for example where CAST sent a food products engineer to some areas in Yiyuan County, Shandong Province, to use the local products of those areas, such as yellow peaches, peanuts, wild jujube, and hawthorne fruit, to make strong efforts at developing production of candy, canned goods, and drinks, from which more than 100,000 yuan was generated in 1986. Recently, at the invitation of a local government on Hainan Island, CAST arranged for 10 food products engineers to go help them develop their economy. Among the things done there, by just substituting the coconut that grows profusely there for peanuts in producing a crispy coconut candy, the plant that had losses of nearly 500,000 yuan was able to turn a profit. At present, CAST is organizing and implementing activities to provide technical services for 10,000 small to medium enterprises. Events such as these, which are so beneficial to the state and to the people, should be supported and encouraged by society. That scientists and technicians should receive some not too high compensation for these things is completely appropriate, and even if it were to be higher, this could not be reproached. It is just fine as long as taxes are paid according to statutes.

"The state has recently decided that scientists and technicians may go out into society, may become involved in contracts, and that shares may be sold for technologies. May I ask your opinion of this?"

"These provisions of the State Science and Technology Commission are in accordance with objective law, and we should support them!" Li Baoheng said, "There are now many scientists and technicians leaving the front lines. Their ages are not great, they are still healthy, and they are knowledgeable. Why should they not fulfill their roles through consulting? We should pay attention to their contributions to the state and the wealth they generate. All over the world, and especially in developed countries, technology is worth money. It is a rising new intellectual product."

I asked about future plans for CAST.

Li Baoheng said, "CAST is an organization that has intensive scientific and technical knowledge and many people. Its detached position can be used as a bridge and link between science and technology and the economy, which would hasten the transformation of scientific and technical knowledge into production forces, and would be of help to developing the potential of scientists and technicians. Naturally, from the point of view of CAST, it is most important to develop decision-making consulting services. As for example demonstrations for the development of the Dongting Hu region as organized by the Hunan Province Science and Technology Association and their demonstrations for planning of the Mawei development region in Fujian Province."

Finally, Li Baoheng said, "I believe that with the continued growth of the restructuring, the cause of scientific and technical consulting services will surely expand, for this is an objective necessity. We hope that each department and each level of leadership will comply with this situation, and will better support and encourage the cause of scientific and technical consulting."

12586

CSO: 4008/2053

NATIONAL DEVELOPMENTS

HEBEI GOVERNOR DISCUSSES S&T PROGRESS

Reasons For S&T Not Advancing

Beijing KEJI RIBAO in Chinese 9 Jan 87 p 1

[Article by Zhang Gefei [1728 2047 2431]: "Why Are They 'Backtracking'?; Thoughts After The Reform Of Some S&T Units; We Should Not Always Fear That S&T Personnel Are Getting Rich; Xie Feng, Governor Of Hebei Province, Talks About Mobilizing The Initiative Of S&T Personnel"]

[Text] As soon as the New Year began, some science and technology units took the initiative to demand economic self-support and large reductions in operating expenses and are now starting to think about "backtracking" and "eating from one big pot." According to this reporter's understanding, the primary reason is that concept and policy cannot keep pace with the actual reform situation.

The Ministry of Railways has 6 independent institutes and one academy with 10 subordinate institutes. In 1986, 12 of these 16 institutes took the initiative to demand a large reduction in operating expenses, well beyond the state mandated 10 percent reduction. Now, 10 institutes have indicated that in 1987, no matter what, they will only reduce expenses in line with state demands. According to a survey of 1,916 science and technology personnel in 19 economically independent institutes in the Shanghai industrial system, 72 percent think they should receive operating expenses again. Why are they thinking of "backtracking?" Not long ago, some institute comrades told reporters of their difficulties.

1. Vertical income cannot compensate for reduced scientific research expenses. There are also obstacles to developing lateral connections.

People generally say that vertical income is a long way from making up for reduced scientific research expenses. According to statistics, in 1985, the non-contract and contract funds allocated to 14 economically independent institutes by upper echelons amounted to only 8.81 million yuan, a 43.3 percent reduction over the scientific research expenses handed down from upper echelons in 1983. Thus, actively developing lateral alliances and infiltrating enterprises was the primary guarantee of an institute's economic independence. Some institutes in Shanghai say that to guarantee technological and product dominance, the leaders

of some responsible departments clearly restricted institutes from transferring technical results to enterprises outside their industry. An institute of the Shanghai Bureau of Light Industry has made several science and technology achievements in the past 2 years. The enterprises in the industry did not want them, but the department in charge would not let them transfer them to other industries so the institute's limiting conditions left them no way to organize production so all they could do was put the technical results on the shelf.

In addition, due to outmoded ideas, people lack an understanding of commercialization of technical results and do not respect the law of value. For example, after the results of an institute of the Shanghai Instrument Bureau passed technical transfer expensed, but the department in charge would only permit the transfer to local firms within the industry which were willing to pay 10,000 yuan. All of this not only influences the income of research institutes, but also causes man-made delays in the process of turning technical results into products.

2. Policies are not coordinated, initiative of "serving" and "relying on" are unbalanced.

After the reform of the scientific research system, on the one hand we mobilized the initiative of scientific researchers and strengthened their awareness of catering to the realities of production. There are 600 people in the Qishuyan Research Institute of the Ministry of Railways, 100 people accepted 2 projects, 37 accepted 3 projects and 13 accepted 4 projects. On the other hand, because the reform of the economic system and the reform of the science and technology system were not coordinated, there is no technical results transfer rate or new product output value in the state's enterprise assessment norms, so that the enterprises' desire to rely on technology are very small. Some people say that for enterprises, scientific research is like a clay figure of a rabbit on New Year's Eve: whether you have it or not you celebrate the New Year anyway. At the same time, the daily increasing apportioning and successive annual increases in the profit to be turned over to higher levels means the enterprise does not have the economic strength to accept the new technology. For example, for 2,000 state run industrial enterprises in Shandong, apart from the stipulated payment to the government and the amount reserved by management departments at various levels, in 1985, only 6.3 percent in reserved profits, an average of 25,000 yuan per enterprise, was left for funds used for expanding production. Enterprises lack "relying on" initiative and vitality, thus the consequence naturally is that there is no market for technology and technology has no worth.

3. Policies are not made good, the economic burden of research institutes is too heavy.

The state and departments in charge formulated a preferential policy for some reformed units, but in practice there is no way it can be honored.

For example, according to relevant state documents: "test point unit scientific research expenses, large scale instruments, and funds for equipment purchases will continue along the original channels." But as it is understood, for special expenses in past plans, some departments in charge would not acknowledge it or converted allocations into loans. The autonomy granted to enterprises early in the reform period also exists in name only. For example, most of the 3 percent promotion rights and institute head responsibility system has vanished into thin air.

In addition, bonuses also cannot be awarded according to the relevant documents of the State Council. For post-reform research institutes which have expended much labor and the material benefits obtained by individual and collectives are less than those from units which "eat from one big pot."

In looking back over the road taken in the last 2 years, the direction of the reform of the scientific research system was correct, the key is that our policy should be of benefit to urging people to think of technology as a product, be of benefit to invigorating the technology market, be of benefit to alliances of research institutes and enterprises, be of benefit to mobilizing the initiative of "catering to" and "relying on" to change the "loose" alliance of scientific research and enterprises into a manifold economic alliances.

S&T Personnel Compensation Problems

Beijing KEJI RIBAO in Chinese 9 Jan 87 p 2

[Text] How best to employ scientific and technical personnel is an old problem which has yet to be satisfactorily resolved. Recently, Xie Feng, Governor of Hubei Province, gave reporters some of his views on this matter.

Xie Feng said that the scientific and technical ranks in Hebei Province are 1) few in number; 2) their direction is incorrect; and 3) their initiative has not yet been fully mobilized. Understanding of the position and role of scientific and technical personnel is still insufficient and in many places and units a relaxed environment has not yet taken shape. In particular, there is one very harmful idea: a fear that scientific and technical personnel will get rich, thus their income and treatment is blocked too tightly and rigidly which has an impact on the initiative of scientific and technical personnel. Once technical service, technical contracts, or holding two or more posts concurrently is mentioned there is concern about what to do if technical personnel have more income. In the rural areas, for example, on the one hand they cry out that there are few scientific and technical personnel for agriculture, forestry, animal husbandry and sideline industries and that conditions are poor, compensation is low, and that the ranks cannot be consolidated, but on the other they are rigidly stubborn when it comes to compensation for scientific and technical personnel. Whether it's "leftist" influence or over-sensitivity, in brief it is fear that scientific and technical personnel

will get rich as if once they become rich it will pose problems and create capitalists. I think if capitalists are produced, they won't be produced from scientific and technical personnel. A specialist family earns several tens of thousands of yuan and can accept it, but for a scientific and technical person to have an income of 10,000 yuan, that would be terrible! What is there to be afraid of?

Looking back on history, Xie Feng said that China's intellectuals are patriotic, but in the past they suffered attack from many political movements. In the past several years, intellectuals and scientific and technical personnel are beginning to receive widespread respect, but in correcting style, due to prejudice on the part of some units in controlling policy, they have criticized a group of scientific and technical personnel who are engaged in such activity as consulting and technical service and have severely dampened the initiative of scientific and technical personnel to make more contributions to economic construction. Some "cases" have still not been untangled, and they are unwilling to conclude them and admit their error. In the past when that group was doing "leftist" things, the peasants said that they were afraid we would become poor and afraid that we would become rich. If they became poor, then we quickly relaxed policy; if they became rich, then we quickly engaged in "rectification" and cut off the "tail." Now we have finally summarized this historical lesson and permitted some of the peasants to become richer first. Thus for scientific and technical personnel who represent the worker class of advanced productive forces why are we afraid they will get rich?

Xie Feng also pointed out another harmful tendency. He said that some people always like to bring compensation for scientific and technical personnel to the level of party and government agency cadres, and always think, "What level is this engineer equivalent to, compared with us, he makes a lot" without considering the special role of technical personnel. What they are saying is that they should be paid according to their labor but actually it is egalitarianism because they are still afraid of scientific and technical personnel getting rich.

Xie Feng said, all of the above obstructs scientific and technical personnel getting to the first line of production, especially to the rural areas. In Hebei Province, for example, very few scientific and technical personnel have gotten to the first line of agriculture, forestry, and animal husbandry. Students in these specialties frequently change fields after graduation, and quite a few experienced specialists change fields. Hebei is an agricultural province, and if this problem is not resolved construction cannot go on. In addition to needing to strengthen training of rural middle school students and production experts, we first of all should mobilize the overwhelming majority of existing scientific and technical personnel to go to the first line of production. In particular, to the rural areas to engage in technical service. That is, allocation policy should really be liberalized, compensation really connected to contribution, scientific and technical personnel should be encouraged to make technical contracts, engage in compensatory service, hold down two jobs concurrently, and be permitted to run enterprises.

How far liberalization of income should go and not be capped? As long as they pay income tax in accordance with state laws, it's all right.

Xie Feng emphasized that to truly improve the circumstances of scientific and technical personnel and liberate this most valuable productive force we must take this route. It is far from enough to limit our thinking to reforming the current wage system. The Central Committee has already liberalized the matter of work compensation for retired scientific and technical personnel and I think we should also liberalize it for scientific and technical workers who are on the job and not fear that they will get rich. Thus one person can take the place of two people or three people. At that time, we will respect knowledge, respect talent, and naturally a social atmosphere will take shape.

8226/9190

CSO: 4008/2055

PROSPECTS FOR YUNNAN'S S&T DEVELOPMENT BRIGHT

Kunming YUNNAN RIBAO in Chinese 29 Dec 86 p 1

[Text] Yunnan's science and technology workers have been ploughing industriously and in 1986 obtained an abundant harvest in Yunnan's science and technology front line. After appraisal by specialists, the Provincial Advanced Science and Technology Prize Committee examined and passed judgment and 93 projects received Advanced Science and Technology Prizes.

Of the projects receiving prizes, one was a first prize, 12 were second prizes, and 80 were third prizes. An evident characteristic of these results is strong practicality. The cooked rice from "High Quality [Zhangyou 0022 6848] New Variety Yunnan Lucky 408" developed in cooperation with the Yunnan Academy of Agricultural Sciences is moist, palatable, delicate in flavor with a sweet taste. Specialists in the field nationwide feel it is a high grade, high producing, multi-resistant new variety and it has already been spread to over 10 provinces and municipalities. The area planted in Yunnan Province this year is 320,000 mu, with an average increase of 200 jin above similar paddy rice, and this result earned a first prize. "Improving Sugarcane Extraction Technology' Sugarcane Extraction Method" which earned a second prize is the result of research by such units as the Provincial Light Industry Institute. It combined the best points of sugarcane pressing methods and extraction methods and attacked the critical technology of sugarcane crushing, pressure extraction processing, and water removal processing and established a new pressure extraction method production technology. After use in production the economic benefits are very evident, pressing 10,000 tons of sugarcane can earn a profit of over 300,000 yuan. The results of "Research on Acute Cerebral Ischemia and Experimental Treatment" conducted by the Kunming Hospital revealed the characteristics of acute cerebral ischemia, and explored the principles of the onset of post cerebral ischemia reirrigation syndrome and provided data for development research on medication for cerebrovascular disease and clinical treatment. The technology reached domestic advanced levels and the value of clinical practice is even more evident.

Among the projects winning prizes this time, researches in the soft sciences were rather numerous which not only indicates that the management

level of science and technology in Yunnan has improved, but also shows the new trends in science and technology development in Yunnan. After test calculations, one of these, "Research on Development of Phosphorus Resources in the Tianchi District," predicted the impact of developing phosphorous resources on the air, soil, water, ecological environment and civilian health in the Tianchi District. Using the method of dividing the plan by environmental function, a rational proposal was put forward to the scale, distribution, and environmental construction of developing the phosphorous resources in the Tianchi District to the benefit of the country and the people so it has awarded a second prize.

8226/9190

CSO: 4008/2055

BRIEFS

ASTRONOMERS OBSERVE MILKY WAY--Kunming, 4 May (XINHUA)--Chinese astronomers have observed variations in light intensity coming from the bl lacerta celestial group, commonly known as the milky way galaxy, on two different occasions. According to Professor Xie Guangzhong from the Yunnan Observatory, "this discovery indicates that 'black holes' may exist in the milky way, and refutes earlier conclusions that this galaxy does not emit variations in light intensity." "The milky way is an active galaxy where light intensity varies greatly," the professor said, "and after calculating the intensity of light coming from the galaxy's center, intensity variations within the galaxy can help determine the existence of 'black holes.'" According to Professor Xie, "to date, only a dozen similar variations have been observed, and the Yunnan Observatory has sited six in the past two years." [Excerpt] [Beijing XINHUA in English 0036 GMT 4 May 87 OW] /12913

NONGOVERNMENTAL SCIENCE ENTERPRISES FORMED--Beijing, 4 May (XINHUA)--Entrepreneurs who have set up China's non-governmental enterprises have founded the country's first association for non-governmental scientific enterprises. The association invited state councilors Fang Yi and Zhang Jingfu, and Fei Xiaotong, vice-chairman of the National Committee of Chinese People's Political Consultative Conference, as honorary members of the association's council. "The boost non-governmental enterprises have given the Chinese economy has come about by furthering scientific reform and bringing the abilities of China's scientific personnel into full play," Feng Xiaotong said at the founding ceremony, adding these enterprises are a significant and indispensable channel in promoting China's scientific and economic prosperity. Fei, also a sociologist, said "The country's non-governmental enterprises are following the correct road, and are active in building socialism with Chinese characteristics. China's 20,000 non-governmental enterprises do not receive state allocations, but collect capital themselves, make their own policies, are independently managed and are responsible for their profits and losses. [Text] [[Beijing XINHUA in English 0659 GMT 4 May 87 OW] /12913

SINO-CANADIAN JOINT EFFORT--Shanghai, 17 April (XINHUA)--The Submarine Project Research Institute of Jiaotong University and the Canadian International Submarine Project Company signed an agreement to build a remote controlled submarine beginning of this month. Both sides had previously established the "Sino-Canadian Submarine Research Center." The Submarine Project Research Institute of Jiaotong University has 35 scientists, technicians and postgraduates. They have developed other remote control submersibles. The

remote controlled subs manufactured and sold by the world-famous Canadian International Submarine Project Company rank first in the world. Zhu Jimao, director of Jiatong University's Research Institute, and James R. McFarlane, president of the Canadian company, have been involved in joint projects since 1980. They have strengthened cooperation in personnel training, transfer of technology in the past two years. The unmanned submarine will support China's offshore oil drilling program and salvage work. [Text] [Beijing XINHUA in English 1402 GMT 17 Apr 87 OW] /12913

SUPERCONDUCTIVE WIRE DEVELOPED--Beijing, 8 April (XINHUA)--A superconductor wire, capable of working with the help of liquid nitrogen coolant, has been developed by the Institute of Chemistry affiliated with the Chinese Academy of Sciences [CAS]. First of its kind in China, the wire, with a diameter of 0.5 mm, offers almost no resistance to electric current and diamagnetism when cooled to a temperature of 83 K (minus 190 degrees centigrade). The temperature has been conformed by the CAS's Institute of Physics. "Now the Institute of Chemistry is able to process superconductor wires with varied diameters, length and shapes and films of different thickness," an engineer said. He said the success "has opened broad prospects for practical use of superconductor materials." Not long ago, the Institute developed superconductors composed of yttrium, barium, copper and oxygen. [Text] [Beijing XINHUA in English 1319 GMT 8 Apr 87 OW] /12913

INTERNATIONAL EXCHANGES ENCOURAGED--About 150 Chinese scientists met with diplomats from 16 countries in Beijing's Great Wall Sheraton Hotel last night to promote scientific and technological exchanges between China and the world's non-governmental organizations. Zhou Peiyuan, honorary chairman of China Association for Science and Technology (Cast), said at the meeting that with the implementation of China's reforms and open policy, international professional exchange activities organized by Cast and its 139 affiliated national societies have been increasing. He said Cast and its member societies have joined 100 international science and technology organizations, with 200 representatives from these societies serving in leading positions in the international organizations. Since 1981, he said, more than 200 international conferences and symposiums have been held in China, with 50,000 people from China and abroad attending. Zhou told CHINA DAILY that the current struggle against bourgeois liberalization is not a campaign to oppose learning science and technology from Western countries. International meetings to be held in China will not only help promote understanding between Chinese and foreign scientists, but also help China learn the newest information in science and technology, he added. Cast officials said the association hopes to organize 100 international meetings annually in its Beijing convention centre by 1990. [By Staff reporter Xu Yuanchao] [Text] [Beijing CHINA DAILY in English 18 Apr 87 p 1 HK] /12913

SUPERCONDUCTOR RESEARCH CENTER PLANNED--Beijing, 11 April (XINHUA)--China has decided to set up a center for research and development into superconductors in a bid to speed up the advancement of the technology in this field. Speaking at a press conference here today, Zeng Xianlin, vice-minister of the State Science and Technology Commission, said that China's superconductor research has reached the internationally advanced level. So the State Planning Commission and the State Science and Technology Commission have

decided to set up a joint research and development center on superconductor technology, which will take charge of the implementation of the plan and organize relevant academic exchanges. The center will be based at the Physics Institute of the Chinese Academy of Sciences in Beijing. Meanwhile, a committee of superconductor experts will also be set up to give advice. Superconductor research is also listed as an independent item in the country's science and technology plan during the 1986-1990 period. Zeng said that the State Planning Commission and the State Science and Technology Commission will exercise direct leadership and coordinate the country's superconductor research. [Text] [Beijing XINHUA in English 1614 GMT 11 Apr 87 OW] /12913

MICROWAVE RELAY--Beijing, 3 May (XINHUA)--Beijing, 3 May (XINHUA)-- A microwave radio and television relay system from Guangzhou, the capital of South China's Guangdong Province, to Haikou, on Hainan Island, started transmitting today. The new line is part of a project linking Guangzhou with Sanya, on the island's southern tip, and the whole system will cover 1,117 kilometers, and pass through 20 cities and counties. "When completed the line will service 20 million residents," an official from the Guangdong Radio and Television department said, adding the Guangzhou-Haikou section, which runs 607 kilometers, can simultaneously transmit four television channels and 12 radio programs from Guangzhou to Haikou and two television channels and six radio programs from the island to Guangzhou. Construction on the line began in 1984. [Text] [Beijing XINHUA in English 0741 GMT 3 May 87 OW] /12913

MASS PRODUCTION COMPUTERS--Beijing, 23 April (XINHUA)--China has selected 19 microcomputers for mass production and sale, an official of the Electronic Development Leading Group under the State Council said here today. The 19 were selected from 87 microcomputers manufactured domestically and are up with their international counterparts. Among them is a "Changcheng" ("Great Wall") 0520-c 16-bit microcomputer, which is up to advanced international standards and operates in both Chinese and English. More than 10,000 were produced last year, about one-third of the national total. At present, there are 130,000 microcomputers in China, many of which are used in industry, commerce, banking and scientific research. [Text] [Beijing XINHUA in English 1013 GMT 23 Apr 87 OW] /12913

TWO NEW COMPUTERS DEVELOPED--Beijing, 28 April (XINHUA)--Chinese computer specialists have developed two new high-performance mini-computers. "The new computers will be used in national defense projects, satellite and missile launching and other civilian use," an electronics industry official announced today. The NCI-2780 super mini-computer, designed and manufactured by the North China Computer Technology Institute, is capable of one million calculations per second. The HDS-8060 computer, a mid-sized model, developed by the No. 32 Institute of the Electronics Industry Ministry, is as popular as similar IBM models on the domestic market. "Some of the computers have been exported, and both newly-developed mini-computers are up to advanced international standards," the official said. [Text] [Beijing XINHUA in English 1001 GMT 28 Apr 87 OW] /12913

ROBOT SPRAY PAINTER PRODUCED--The labor of spray painters is strenuous, and they are subject to poisoning by harmful gases. The PJ-1 spray painting robot successfully developed by the Beijing Institute of Mechanics and Industrial Automation of the State Commission on Mechanical Engineering has been proven through industrial application to free workers from this kind of harmful environment. After 4 years of research, the PJ-1 spray painting robot was approved at the ministry level at the end of 1985. Last year, Beijing Jeep Company, Ltd., used this robot in its body painting production line, where nearly 4,000 vehicles were painted. This type of robot is easy to use, and as long as the robot is taught once by hand, it can remember all kinds of work-required painting routines. After that, it will automatically recall them and perform them repeatedly. The Beijing Jeep Company, Ltd., made a comparison test of this robot and advanced spray painting robots imported from abroad, which confirmed that the application results from the domestically produced PJ-1 spray painting robot are at the level of similar foreign robots of the 1980's, and that they can improve quality and efficiency, as well as save on paint materials. The PJ-1 spray painting robot has gone into batch production at the Beijing Institute of Mechanics and Industrial Automation, and its price is much less than that of imported robots. [Text] [Beijing RENMIN RIBAO in Chinese 23 Jan 87 p 3] 12586

CSO: 4008/2053

END